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DEVELOPMENT OF FILMSTRIP SEQUENCE PHOTOGRAPHS AND SOUND REPRODUCTION OF EDUCATIONAL TELEVISION PRESENTATIONS.

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BLACK AND WHITE FILMSTRIPS THAT REPRODUCED STILL PICTURES AND SOUND TRACK FROM EDUCATIONAL TELEVISION BROADCASTS WERE USED TO STUDY THE EFFECTIVENESS OF ETV REPRODUCTIONS IN AIDING POOR ACHIEVERS. THE SPECIFIC ADVANTAGE OF SUCH A REPRODUCTION WAS THAT IT COULD BE PACED TO THE LEARNING TEMPO OF THE STUDENTS RATHER THAN USING THE TOO-FAST PACE OF A REGULAR BROADCAST. THE PROJECT WAS DIVIDED INTO TWO PHASES. PHASE 1 CONSISTED OF THE PRODUCTION OF THE FILMSTRIPS, UNIT GUIDES, AND TEACHER AND PUPIL STUDY MATERIALS. PHASE 2 TESTED THE FILMSTRIPS, WHOSE TOPICS WERE GEOGRAPHY AND EARTH STUDY, ON TWO MATCHED GROUPS OF POOR ACHIEVERS IN GRADES 7 AND 8. TWO OTHER MATCHED GROUPS WERE USED AS CONTROL SECTIONS. DUE TO A PROBLEM IN TIME SEQUENCING OF THE ORIGINAL BROADCASTS WHICH DID NOT PERMIT SEQUENCED FILMSTRIPS TO BE PRODUCED, THE EFFECTIVENESS OF FACING STILL PHOTOS AS A FACTOR IN LEARNING WAS NOT EXPLORED. THE INVESTIGATOR DID CONCLUDE THAT FILMSTRIP REPRODUCTION FROM ETV BROADCASTS IS FEASIBLE AND THAT SUCH REPRODUCTIONS CAN SOLVE THE CONFLICT OF BROADCAST AND CLASSROOM TIME SCHEDULES. FROM POST-EXPERIMENTAL ATTITUDE TESTS, THE INVESTIGATOR CONCLUDED THAT PUPILS HAD A MORE FAVORABLE ATTITUDE TOWARD THE SUBJECT IN WHICH THE FILMSTRIPS WERE USED BUT DID NOT NECESSARILY MENTION THE FILMSTRIPS AS A REASON. (PM)

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FINAL REPORT

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February 1967

U. S. Department of Health,
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DEVELOPMENT OF FILMSTRIP SEQUENCE PHOTOGRAPHS AND SOUND REPRODUCTION OF EDUCATIONAL TELEVISION PRESENTATIONS

Project No. S-1409

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Harry R. Martini

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INTRODUCTION

The project was one designed to explore the reproduction possibilities of educational television broadcasts. The particular reproduction technique performed within the scope of the project was the preparation of 35 mm black and white photographs assembled into a filmstrip sequence for viewing. The original broadcast audio portion of the presentation was tape recorded and sycronized for use with the E.T.V. filmstrip reproduction.

Several specific objectives were established for the project in its original format. Among these objectives were the following:

> Can E.T.V. broadcasts be reproduced on black and white photographs?
>
> Can pupils learn from viewing still photo reproductions of E.T.V. programs previously broadcast?
>
> Is the pacing of still photos vs. E.T.V. viewing a factor in the effectiveness of learning for some types of learners?
>
> Can still photo viewing of E.T.V. broadcast reproductions effectively reinforce prior television viewing or classroom lessons?
>
> Can still photo viewing of E.T.V. reproductions be an effective learning experience for remedial work and absentees?
>
> Can E.T.V. broadcast reproductions in filmstrip form solve the scheduling conflict of E.T.V. broadcast schedules vs. independent school class schedules?

The specific purposes for which the project was developed were twofold. Educational television is an effective medium of communication. Its value as an instructional medium has been demonstrated countless times. It does, however, have some handicaps preventing full utilization in normal classroom teaching. E.T.V. broadcast reproduction has been the attention of considerable research, and the stimulus for the development of elaborate reproduction schemes and devices. The project reported here was an attempt to design an approach to reproduce E.T.V. broadcasts in such a way that, should it prove to be successful, it could be adopted by nearly any school, school district, regional instructional center or state educational facilities; all of which might be restricted by financial and technical resources or by qualified personnel.

A second purpose was one whereby a local school could solve some scheduling problems which arise between school class schedules and E.T.V. program broadcasts. Except for self-contained classrooms, E.T.V. broadcasts will not permit more than one class of a given teacher to view an E.T.V. program when it is broadcast. Large group instructional activities, direct cable-link, and closed circuit for local broadcasts have been attempts to solve the problem of schedule conflicts. But any school not equipped in some special way will not have the opportunity to utilize to the fullest potential E.T.V. program broadcasting. The project was a plan to overcome broadcast conflicts and limitations by permitting a repository of reproductions to be available in a practical but reasonably inexpensive way.

The solution undertaken in the project was one of 35 mm photography in black and white with perhaps some supplemental color added by some means. The camera and necessary film projection and tape recording apparatus used are standard audio-visual equipment for most schools and are used with reasonable ease by most classroom teachers. The aim of the project was the development of a reproduction technique which would be inexpensive, instructionally valuable, and possible for teachers to use.

Project Personnel:

Project personnel were selected in order to use the various skills, techniques, abilities and interests of the school's existing professional and clerical staff. The primary goal of trying to develop a technique within a local school utilizing the regular staff and equipment was the key factor in this decision; sophistication of personnel and equipment was not important. All project personnel had worked as a group for several years in instructional and materials development projects. Project assignments and responsibilities are outlined in Appendix A.

A personnel accounting system was developed to tabulate and record work load and project activities. The individual staff members were responsible for personal time accounting records. The work activities were coded to permit eventual tabulations by a computer system. Appendix B is a sample form used in personal time and work activity accounting.

In addition, a monthly time allocations/cost analysis form was developed to tabulate and record individual and total personnel costs. The form is attached as Appendix C.

METHOD

The project developed into a two-phase operation. The two phases concentrated on different aspects of the study but did overlap somewhat in the timing and sequence of project events.

The project was designed to reproduce E.T.V. broadcasts into black and white filmstrips syncronized with the original audio which was reproduced on recording tape. The grant established a goal of 200 reproductions in the subject areas of geography, earth science, climatology, and meteorology. The agreement and approval was sought from and granted by WHYY (Channel 12), Philadelphia and Wilmington to use their broadcasts for reproduction purposes.

In addition to the production of E.T.V. broadcast reproductions, the project was designed to study the effectiveness of E.T.V. broadcast reproductions in several types of learning situations:

> Can E.T.V. reproductions be used effectively with poor achievers by utilizing the opportunity to pace instruction to their ability rather than to the tempo of the original broadcast?
>
> Can pupils of long duration absences utilize E.T.V. reproductions to make-up unattended classroom instruction?
>
> Can individuals or small groups of learners in need of remedial instruction profit from viewing E.T.V. broadcast reproductions?

With the scope of the project in mind, it is apparent that the project became a two-phase operation. For purposes of explanation, the project operations will be identified and explained according to the phase in which each took place.

PHASE I - PRODUCTION ACTIVITIES:

E.T.V. Broadcast Photographing Procedure:

From the monthly schedule of E.T.V. program listings of WHYY, a weekly reproduction schedule was compiled. At the beginning of each week the weekly E.T.V. broadcast reproduction schedule (Appendix D) was examined to determine the broadcasts to be photographed for the following days. Teacher class assignments and photographic duties were determined. The reproduction schedule time notations reflect class period time allocations and E.T.V. broadcast times.

Preliminary checks were made each morning to determine the effectiveness and working order of the equipment, and the quality of TV reception.

Photographing and taping were conducted simultaneously during each broadcast by one individual. Photographs were taken frequently enough to permit an adequate sequence of still photographs to ensure continuity of ideas and adequate photo coverage. The audible advance signal was placed on the recording tape with a key-punch oscillator as each photograph was taken.

At the completion of each E.T.V. reproduction broadcast, two copies of the tape and filmstrip identification data form were completed. (Appendix E) Copies were made available to project personnel and to the librarian for use in the school's audio-visual library.

Reproduction Activities:

The initial production activities commenced with the beginning of the school term (September 1965). The major task was the reproduction of E.T.V. broadcasts on black and white film. The negatives, since all photographing was done with negative film, required development. Positive prints were made from the negatives and they too required development. Negative film was used in the photographing stage to permit the negatives to become a permanent source from which additional filmstrips could be produced. The photographic equipment and materials are outlined in Appendix F. A diagram of the photographic laboratory and photography darkroom are shown in Appendix G. The darkroom was a facility of the school when originally built; while the photographing took place in a storage room annexed to a classroom. No alterations were required for either room except a portable space heater was used in the normally unheated darkroom to make the developing chemicals useful.

The audio portion of E.T.V. reproductions was taped at the time of the original broadcast. The tape recorder was plugged into the TV receiver and recorded directly. A headset earphone was necessary since the sound had to be heard and recorded to prevent disturbing classes in an adjoining room. The audio equipment is listed in Appendix F.

Film/Audio Editing Activities:

The tape and films were edited as soon as practicable and convenient after photographing. The negative was examined for quality, content, sequence of photos, and adequacy of photo coverage while the original tape was replayed. Any editing required of the film or tape would be noted prior to final positive filmstrip printing. The original plans anticipated the splicing of color frames to highlight key ideas. The color frames would be spliced into the filmstrip. The splicing operation, the cost of color film, and the risk of damage in production prevented the use of color frames. Instead, color was added by applying a film dye to the finished black and white filmstrip. The film dye, its formula for use, and its application are included in Appendix F.

Filmstrip Printing Activity:

After editing, each filmstrip was printed on positive film. Since the photographing was accomplished by positioning the camera in a normal photographing position, the filmstrips resulted in double-frame pictures. The filmstrips were printed on a manual advance filmstrip printer. The printing exposure time was regulated by using a metronome after trial printings had established the correct exposure time calculations.

Filmstrip/Tape Syncronization Activity:

After the filmstrips were printed and the tape edited, each filmstrip and tape was syncronized with a filmstrip advance signal which was placed on the taped audio of the original E.T.V. broadcast. The signal was placed on a separate channel, requiring special tape recording equipment (see Appendix F), prior to the final copying of the original audio and advance signal. The advance signal placement is an essential part of the audio since the sound and visual image must appear at the most strategic moments in time for the most effective learning.

Writing Activities:

Writing activities centered on the preparation of teacher-use materials and pupil-use materials.

Teacher-use materials consisted of prepared unit guides and lesson guides. Unit guides were developed for the unit of study in which E.T.V. reproductions were to be used. The content was developed without regard to the nature of the E.T.V. reproductions but, instead, to the needs of the learners. When the unit content was developed, the E.T.V. reproductions were screened to select those suitable for incorporation into the learning activities for the unit. Appendix H is an example of a unit guide with the appropriate notations indicating E.T.V. reproduction use.

Lesson guides were prepared for the E.T.V. reproductions. The guides were designed to be helpful for any teacher not just those involved with the project. The guides consisted of key sections which detailed the objectives, key terms, problems presented, content abstract, enrichment/follow-up activities, and supplemental library reference materials. The enrichment/follow-up activity suggestions were designed to be of a group or an individual nature. Appendix I is a sample teacher-use lesson guide.

Pupil-use study guides were prepared to accompany the E.T.V. reproductions. The study guides were prepared with major emphasis on the use of visuals and objective answer responses. The use of visuals was an attempt to better motivate and involve the nature of the learner to which the project was committed. Short, objective type, response items were highlighted in order to avoid frustration, to reduce reading handicaps and to keep interest alive. Sketches, diagrams, cartoons, maps, puzzles,

and word games were used in the preparation of pupil-use study materials. Appendix J is an illustrative example of the pupil-use study guides developed to accompany the E.T.V. reproductions.

PHASE II: E.T.V. FILMSTRIP UTILIZATION ACTIVITIES:

Pupil Sectioning Activity:

At the beginning of this school year (September 1966), poor achievers were matched for grades 7 and 8. The original plans were for the groups to be matched for age, sex, intelligence quotient, reading scores, attendance record, geography achievement scores, and number of repeaters. The pupils assigned to the sections receiving some instruction utilizing E.T.V. reproductions were presented an explanation of why they were assigned to their section. Class periods had an instructional duration of 47 minutes. The time allocation potential permitted an educationally sound and effective instructional activity.

A detailed list of pupil data identifying individual pupil characteristics is outlined in Appendix K .

E.T.V. Reproduction Utilization Procedures:

For purposes of explanation, the chief instructional problems the project was created to explore are repeated as follows. Each problem is accompanied by the originally suggested study design.

Problem: Can pupils learn from viewing still photo reproductions of original E.T.V. programs previously broadcast?

Study Design Procedure: Most completed E.T.V. reproductions will be used to solve this problem. All filmstrips will be used with the experimental group in the following recommended manner:

E.T.V. Reproduction Introduction: Briefly describe E.T.V. reproduction content. List on the chalkboard or project with an overhead the key ideas to look and listen for. List key problem or problems to be solved during the lesson.

Administer Pre-Test and Announce Post-Test.

View E.T.V. Reproduction

Stop tape whenever need seems apparent or when requested by pupils.
Encourage pupil participation if tape is stopped.
Complete entire E.T.V. reproduction during period scheduled.

Administer Post-Test.

Perform Follow-up Study:

Use pupil study guide and/or alternate activities.

Problem: Is the pacing of still photos vs. E.T.V. viewing a factor in the effectiveness of learning for some types of learners?

Study Design Procedure: Several, say ten (10), E.T.V. reproductions can be used with one group and the alternate experimental section can view the original show on Channel 12 when it is scheduled. The two presentations do not have to be shown at the same time of the year. The alternate group can view the television presentation when shown during regular broadcast programming. A quiz of about 15-25 items can be used to compare results.

It is important to point out that the television viewing group should be scheduled for geography classes during a 9:30-9:55 or a 10:05-10:30 time block. (If during 9:30-9:55, it should be a grade 7 class; and if during 10:05-10:30 it should be a grade 8 class.) If scheduling of these times is not possible, it is recommended that a flexible scheduling attitude be established at the beginning of the school term with the teaching team of the involved sections to provide for such contingencies.

It is further recommended that the content of the broadcasts be organized in such a way to provide allowances for classroom instruction at intervals injected during the length of the school term as required by the E.T.V. broadcasts.

Problem: Can still photo viewing of E.T.V. broadcast reproductions effectively reinforce prior television viewing or classroom lessons?

Study Design Procedure: The E.T.V. reproductions could be shown to any group of pupils after they have studied a given content area. Comparisons of pre-E.T.V. viewing test and post-E.T.V. viewing test scores can be made. (Perhaps a more sophisticated design would be one whereby four tests could be given before and after each type of learning experience, i.e. conventional instruction and E.T.V. reproduction viewing.) In addition to test scores, an attitude survey could be conducted to determine the feeling pupils have for conventional instruction vs. E.T.V. reproduction viewing.

It is recommended that about 10-20 surveys be completed. Surveys of this nature could be conducted with average pupils assigned to sections beyond the scope of the project.

Problem: Can still photo viewing of E.T.V. broadcast reproductions be an effective learning experience for remedial work and absentees?

Study Design Procedure: The procedure to be followed is one of a voluntary nature. Pupils should be given a study sheet telling of E.T.V. reproductions to be used in the units of study. The schedule should be given to the pupils at the beginning of each unit. In addition, they should be encouraged to view the E.T.V. reproductions if they have been absent or feel a need for remedial work.

Records should be kept to indicate the name of the pupil-viewer, the title used, the length of viewing time, nature of assistance requested (if mechanical operation, or if E.T.V. reproduction content). Be specific in explaining the nature of the assistance.

Test score comparisons can be made to study the effectiveness of the E.T.V. reproductions. The class scores can be compared with the absentees or remedial viewers. It is for this reason that accurate records should be kept in accordance with the recommendations listed in the preceding paragraph.

The library would be an ideal facility to use for this purpose. The library could have equipment and materials at all times. In addition, the librarian could assist individual pupils with the use of the viewing equipment.

Data Collection and Uses:

During the operations dealing with Phase II of the project, several kinds of data were collected for use in the final analysis of the project.

Data were collected to study achievement by using the Brandywine Achievement Test in Geography for Secondary Schools, Forms A and B, attached as Appendices L and M. The test was administered in June 1966, at the termination of grade 6 for entering seventh graders and at the end of grade 7 for entering eighth grade pupils; in September, 1966 to check forgetting over the summer and to check growth comparisons with the final test administration of December 1966, after the instructional activities dealing with the project had ended.

The Brandywine Achievement Test data were compiled and portrayed by preparing and analyzing section profiles and individual profiles with matched individuals of the two sections of grade 7 and 8 pupils receiving conventional or E.T.V. reproduction learning activities. A sample section profile is Appendix N and a matched pupil profile appears as Appendix O.

In addition to the achievement test, major unit tests were administered for data collection. Finally, several weekly review quizzes were administered to check short term pupil progress. All data were collected to compare instructional results of the four sections of pupils participating in the project's experimental or control activities.

Locally, An Attitude Measurement Scale for Geography, Appendix P, was prepared for project use. The instrument was used to collect data on the feelings pupils had for the contrasting instructional approaches and activities of the matched groups. Also, the data were used to compare pupil attitude and achievement.

When sectioning the pupils in the matched groups, additional data for pupil section assignments were collected from the permanent pupil record folders maintained by the school guidance personnel.

RESULTS

During the course of the project operations certain results were achieved. To follow the previously established pattern of reporting, the following outline of problems with results is presented.

Problem: Can E.T.V. broadcasts be reproduced on black and white photographs?

Results:

1. During the course of the project the participants were able to photograph and tape 165 black and white filmstrip reproductions.

2. A total of 69 E.T.V. broadcast reproductions were printed into black and white E.T.V. filmstrip reproductions.

3. 39 E.T.V. broadcast reproductions were printed and edited with an audible advance signal and available for instructional purposes.

4. 5 unit content outlines were written for teacher use to accompany and demonstrate where completed E.T.V. reproductions were profitably suited for classroom instruction.

5. 91 teacher-use lesson guides were prepared to accompany E.T.V. broadcast reproductions.

6. Pupil-use study guides were prepared for 91 E.T.V. broadcast reproductions.

7. Successful experimentation was conducted to prepare and color-dye entire frames of selected filmstrip reproductions.

Problem: Can pupils learn from viewing still photo reproductions of E.T.V. programs previously broadcast?

Results: The following discussion should be examined with this idea in mind; the experimental groups in grades 7 and 8 are referred to as group 7 and group 8 respectively.

Pupil Achievement Scores and Profile Analyses Grade 7: When a careful comparison of profiles of matched pupils is made of the June, September and December Brandywine Achievement Test in Geography scores the following ideas appear:

1. In 8 of 11 cases (73%) pupils of group 7 scored higher in June than matched pupils of group 7'.
   In 3 of 9 cases (27%) pupils of group 7 scored higher than matched pupils of group 7' in September. In 2 cases (18%), the pupils of both groups scored the same.
   In the present sample, pupils of group 7 were better achievers in grade 6 but were also the greater forgetters over the summer.

2. In 6 of 11 cases (55%) the pupils of group 7 scored higher in December than matched pupils of group 7'. Of these 6 pupils, 5 scored lower than their matched pupils in September. Pupils of group 7 achieved in raw score growth to a greater degree than their matched counterparts of group 7'.

3. In general, the youngsters of group 7 scored considerably higher when outscoring their group 7' counterparts. In 2 cases, the group 7' pupils outscored by a great margin their group 7 counterpart.

Pupil Attitude Analysis - Grade 7:

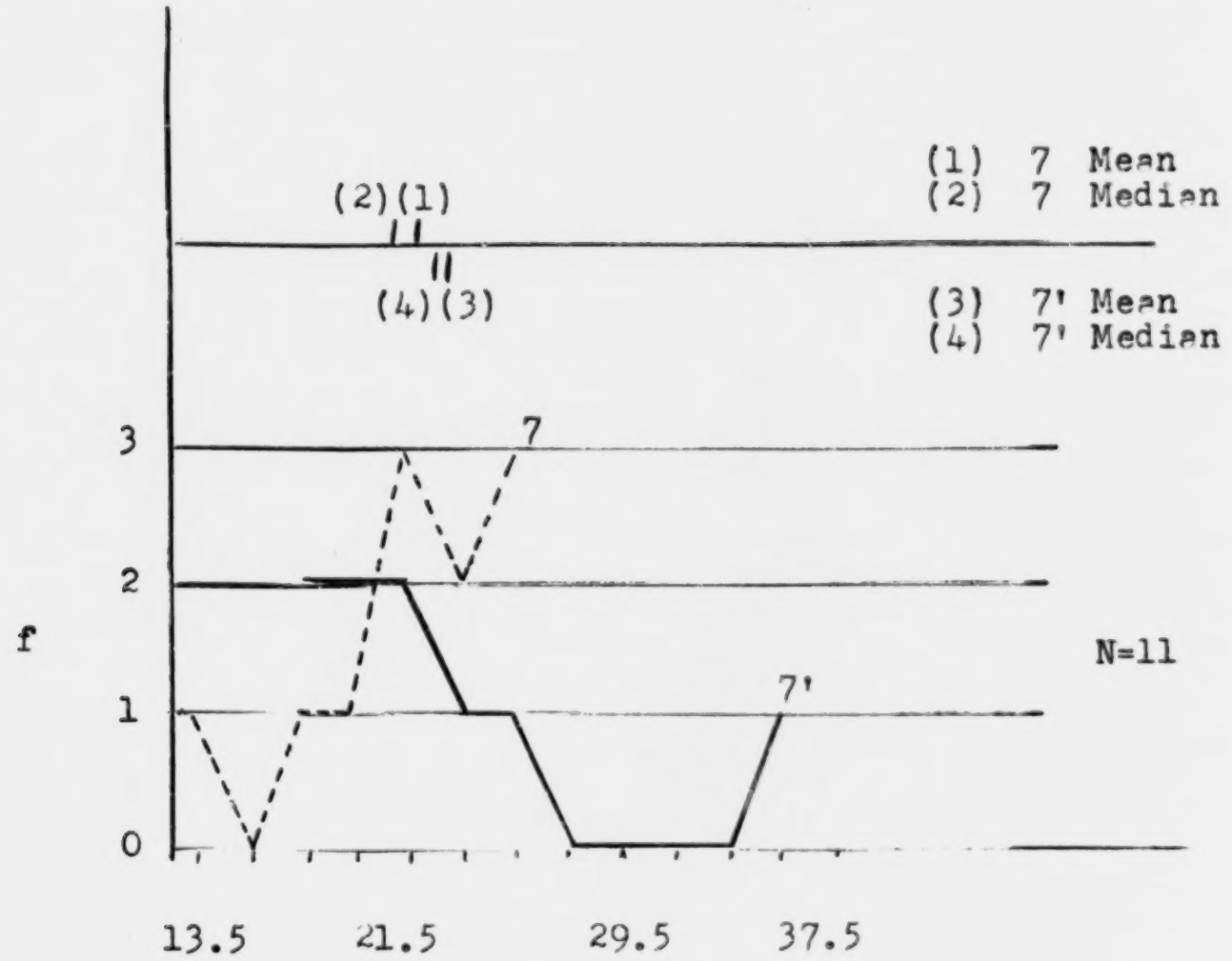
1. In 5 of 11 cases (45%) the pupils of group 7' indicated a higher attitude rating for geography classes than their matched counterpart. In 5 other cases (45%), the attitude scale indication was the same for the matched pupils.
   The group which indicated a poorer attitude for geography class consisted of individuals who achieved higher growth scores than their counterparts. However, the group viewing E.T.V. reproductions in their instruction indicated the more favorable attitude for geography classes.
   See Table I of Appendix Q.

2. When given the opportunity to comment on class activities 4 of 19 youngsters of group 7' referred to E.T.V. reproductions in specific and favorable terms while one pupil made a negative comment concerning their use in class activities. It is noteworthy to point out that instruction in both grade 7 groups consisted of considerable use of audio-visual instructional techniques.

Statistical Analysis of Test Data - Grade 7:
Test data collected for the Brandywine Achievement Test In Geography are presented for comparative study.

The data treated below consist of the December test scores and reflects the achievement after the completion of the E.T.V. reproductions in classroom activities.

Group	Mean	Median	Standard Deviation
7	21.68	20.67	3.56
7'	22.85	22.00	4.98



DECEMBER 1966 GEOGRAPHY ACHIEVEMENT SCORES

An analysis of the above indicates the comparative positive growth of group 7' over group 7. A detailed tabulation of scores is attached as Appendix K.

Pupil Profile Analysis - Grade 8: By comparing individual profiles for matched pupils of group 8 and group 8', the following observations were made:

1. At the June test administration, in 5 of 11 cases (45%), pupils of group 8' scored higher than pupils of group 8. In 2 cases (18%) the matched pupils achieved identical scores. In 8 of 11 cases (73%), the pupils of group 8' scored higher than their matched counterpart in group 8 in September. In one case they scored the same.
   In 7 of 11 cases (64%), the pupils of group 8' scored higher than their counterparts in December.
   The pupils of group 8' were better grade 7 achievers, retained more over the summer, and grew more until December than their matched pupils of group 8.

2. Where comparative growth was made it was evident that pupils of group 8' achieved at more significant rates over the scores of their matched counterparts.

3. One very interesting observation is one in which 7 of 22 pupils of both grade 8 groups scored lower in June than in September. The observation seems to cast some doubt on the administration of final examinations at the end of the academic year. Perhaps poor achievers feel they have nothing to gain and consequently do not put forth maximum effort during final examinations.

4. Equally interesting is the fact that 8 of 22 pupils in both groups scored lower in December than in September. The research associate working with the two groups was decidedly impressed with the adverse group psychology of group 8, which was the recipient of E.T.V. reproduction instruction. Of the 8 low scorers in December, 5 were assigned to the group with the poor group psychology. The negative attitude of the group was directed to academic performance in general and to school citizenship performance but did not appear in individual attitude ratings for geography classes. See Table II of Appendix Q.

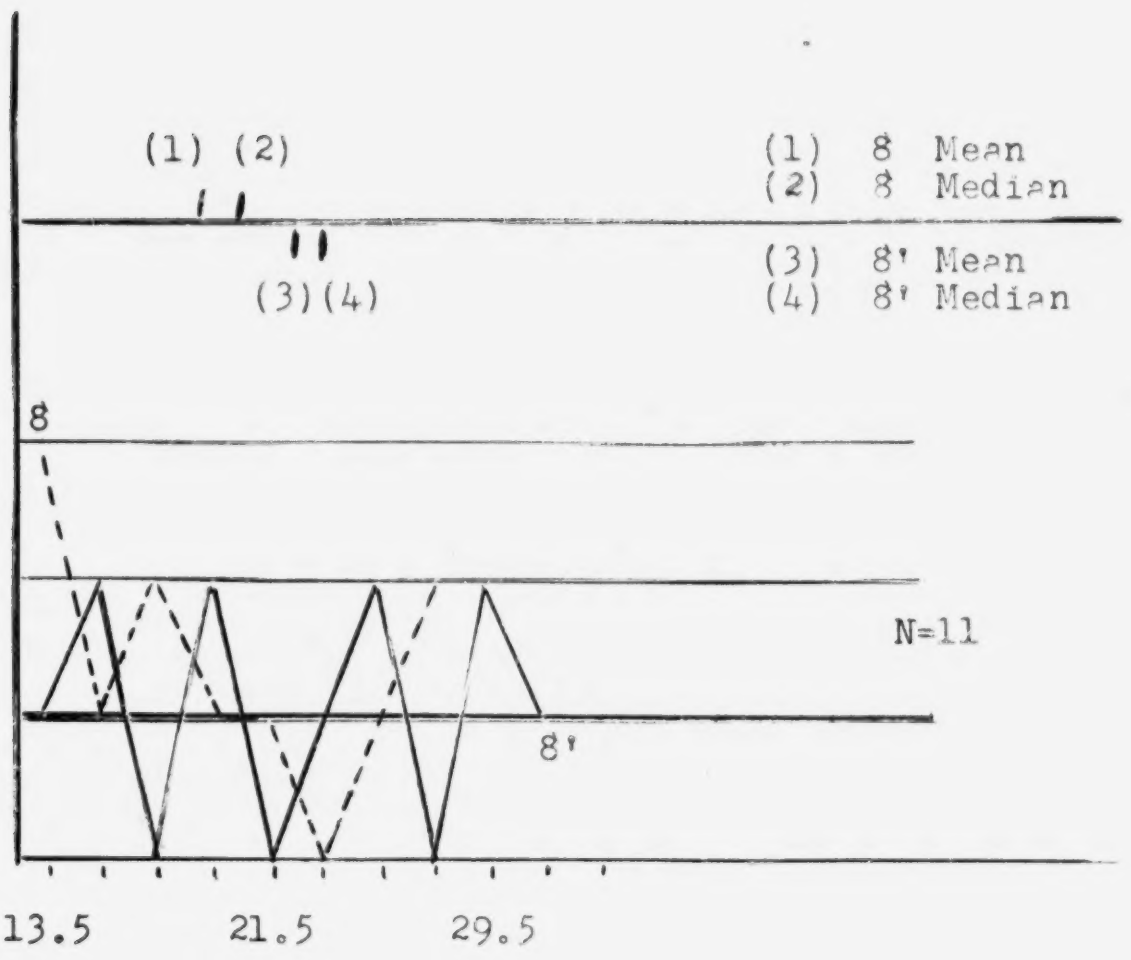
Pupil Attitude Analysis - Grade 8:

1. In 5 of 11 cases (45%), pupils of group 8 selected a higher attitude rating than their counterpart of group 8'. In 4 cases the matched pupils of both groups indicated the same attitude rating.

2. When given the opportunity to comment on class activities 4 of 23 pupils of group 8 made a direct reference to the use of E.T.V. reproductions in classroom activities. Three of the responses were favorable and one was negative in reference to their value. The instruction of both groups relied heavily on the use of audio-visual instructional activities and may account for the lack of comment on the E.T.V. reproductions since they were quite familiar with all types of instructional media.

Statistical Analysis of Test Data - Grade 8: The test data collected for the December administration of the Brandywine Achievement Test in Geography are as follows:

Group	Mean	Median	Standard Deviation
8	19.32	18.00	5.26
8'	22.59	23.50	5.85



DECEMBER 1966 GEOGRAPHY ACHIEVEMENT SCORES

A detailed tabulation of the above scores is attached as Appendix K.

Grade 8 Unit Tests and Periodic Quizzes: An analysis of the raw scores of grade 8 unit tests and periodic quizzes supported the better achievement of group 8 over group 8'. Median scores were determined and used as a basis for the comparative growth.

Problem: Can still photo viewing of E.T.V. broadcast reproductions effectively reinforce prior television viewing or classroom lessons?

Results: The two research associates were able to conduct learning experiences of the type within the scope of this problem. Although they were unable to collect statistical data for analysis, they do feel that in the several cases they were able to use E.T.V. reproductions, as a review or summary, it was a successful experience for the pupils.

Problem: Is the pacing of still photos vs. E.T.V. viewing a factor in the effectiveness of some types of learners?

Results: This problem was not explored due to the difference in time during which the various units were taught in the classroom and the time during which the E.T.V. broadcast would have been presented. Certain units build concepts which cannot precede other concepts. As a result, instructional units were developed in a certain sequence, the nature of which would not permit adjustment to coincide with the E.T.V. broadcasts.

Problem: Can still photo viewing of E.T.V. reproductions be an effective learning experience for remedial work and absentees?

Results: The original plan for providing an opportunity for remedial work and absentee instruction make-up was not followed. Personnel time to provide the necessary direction, coordination and instructional assistance was not possible. In addition, the demands placed upon the library for use as a class instructional facility would have resulted in scheduling conflicts and adverse learning situations for the learner doing remedial or make-up work.

Problem: Can E.T.V. broadcast reproductions in filmstrip form solve the scheduling conflict of E.T.V. broadcast schedules vs. independent school class schedules?

Results: When E.T.V. broadcast reproductions are processed for use, they can be used to avoid class schedule conflicts with E.T.V. programming schedules. A repository of E.T.V. filmstrip reproductions can serve as a source of instructional materials without regard to time of day or time of year for E.T.V. program broadcasting.

DISCUSSION

E.T.V. Broadcast Reproductions: With some photographic background, the technical skills and knowledge required to reproduce E.T.V. broadcasts is within the capability of one interested but not necessarily technically trained in photography. Project personnel had varying degrees of training and amateur experience with photography. With the pooling of knowledge and the sharing of experiences, personnel involved with photographing became proficient in the various photographic activities.

The quality of television reception in any given area will ultimately determine, in part, the quality of photographic reproduction of television images. Seldom were any reception problems encountered except when signal disturbances would be created due to operating bus engines. With understanding on the part of all parties such problems were easily overcome.

E.T.V. Reproduction Developing: The original plan consisted of a filmstrip reproduction with a length of approximately 72 frames each. Experience demonstrated that filmstrips were 1/3 longer with an average length of 108 frames. Several were considerably longer when a presentation of greater than 25 minutes was photographed.

The additional length of the filmstrip reproductions resulted in increased film consumption and, most significantly, increased time requirements for printing positive filmstrips.

E.T.V. Reproduction Editing: The editing of the E.T.V. reproductions was one of the major difficulties experienced during the project. First, and very serious, was the activity whereby the audio-advance signal was placed on the tape. During the first 100 E.T.V. reproductions no audible-advance signal was placed on the tape as each photograph was taken. This resulted in the task of placing an audible-advance signal on the tape at a later time. This required the effort and time of two individuals; whereas, the audible signal, if placed when photographing, requires very little time in the final editing operation.

All project personnel were responsible for teaching a partial load. Hence, two individuals could be free for editing purposes only at short intervals of time, usually too short an interval to complete the editing of an entire reproduction. As a result, some time was lost in simply rechecking work previously done, due to interruptions or lapses in the editing process.

Study Design Supervision: Late in the spring of 1966, each problem assigned for study was analyzed. A study design was developed for each problem. The study design was not carried through in some cases. The reason follow-up or direct

supervision was not possible was due to the teaching commitments of the project personnel. There was no time available for project supervision, coordination, and study. During Phase II of the project operations the trials conducted by the research associates were part of their regularly scheduled teaching assignments. During Phase II, the principal investigators assumed full and normal teaching-load schedules.

E.T.V. Reproduction Potentiality: Despite the technologically advanced reproduction possibilities, the project personnel feel that the use of E.T.V. filmstrip reproductions is educationally sound. Personnel who participated in or observed the use of E.T.V. filmstrip reproductions favor their use for these reasons:

1. The quality of the photographs is excellent. The photographs reproduced from a well functioning receiver are as good as the original broadcast image.

2. The direct taping of the narration gives the viewer a relief. The program has not been rehearsed or impeccably presented in the case of a motion picture. Coughs, throat clearings, pauses, corrections all serve to add a personal touch to the learner which no other medium offers. Only the classroom teacher can duplicate this aspect of humanism.

3. In classroom experiences occasion to stop and discuss, with relative ease, a problem idea is a distinct advantage of the E.T.V. reproduction over the broadcasts. Pacing for poor achievers seems to have value.

4. E.T.V. reproductions can supplement a teachers instructional activity, particularly if the teacher maintains good rapport with the youngsters but may have a poor instructional delivery due to some personal weakness or irritating habit.

5. By using E.T.V. reproductions in-service teachers can grow by observing teaching and demonstration techniques utilized in the E.T.V. reproduction.

6. E.T.V. reproduction observation provides an opportunity to motivate and capture the interest of youngsters for additional learning activities by using well prepared pupil materials.

7. The project personnel were able to develop and prepare excellent teacher-use and pupil-use materials to accompany the E.T.V. reproductions.

E.T.V. Reproduction Classroom Instruction: During class activities, the experimental groups and the control groups of both grade 7 and grade 8 received instruction with a great deal of audio-visual techniques. The use of many instructional media with the experimental group undoubtedly had an influence on the outcome of learning. In other words, the study being reported is not really a study of E.T.V. reproduction use vs. conventional classroom instruction, but instruction which was heavily audio-visual oriented.

Incomplete Project Work: As previously reported in the section outlining project results, there is a backlog of printing and writing activities. The completed E.T.V. reproductions with accompanying teacher and pupil use materials represent only 1/3 of the materials available from photographing E.T.V. broadcasts. The processing of the increased length of the filmstrip reproductions and the underestimation of time requirements in editing them account for the backlog of unfinished E.T.V. reproductions.

Statistical Collection and Interpretation Problems:

During Phase II of the project, two serious problems developed with pupils participating in the matched groups.

The first of the problems concerned pupils of the four sections participating. In the beginning of the year there were 26 matched youngsters in each of the sections, two seventh and two eighth grade. Due to absences, or section reassignments, data was collected under controlled conditions for only 22 seventh grade pupils and 22 eighth grade youngsters; or 11 youngsters in each of the matched sections. The original statistical sample consisted of a very small group, but due to the problem of absences and transfers, the sampling was reduced to a degree at which statistical collection and analysis was extremely questionable.

The second problem developed with one group of eighth grade pupils. The group psychologically deteriorated to the point where adverse attitudes on the part of individuals seriously affected the academic performance in some subjects and school citizenship in general. The feeling persists with the research associate working with the group that any statistical data would be highly questionable. When individual pupil profiles were prepared for these youngsters, achievement scores supported this opinion.

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Conclusions:

E.T.V. broadcasts can be reproduced in filmstrip sequence photographs. The use of 35 mm. negative film and positive print film is adequate to do the task quite satisfactorily. The process can be operated simply with a minimum of technical knowhow and certainly within the means of most school district units.

E.T.V. broadcast reproductions can solve scheduling problems which exist between broadcast programming and independent school class schedules.

Results tend to indicate that pupils can learn from viewing E.T.V. reproductions. Results also tend to show that youngsters experiencing activities with the use of E.T.V. reproductions show a more favorable attitude for classes in which they are used. The experience and evidence of the grade 8 groups in the project reported here bear this point out.

There is some indication that E.T.V. reproductions can be used effectively with average pupils in classroom activities.

Perhaps a great value in using E.T.V. reproductions is the certainty of content for which the teacher can plan instruction, the certainty of planning pre-viewing and post-viewing pupil activities, and the ability to pace and program instruction to the comprehension level of the viewing pupils. In the case of this report, the viewing youngsters were poor achieving seventh and eighth graders.

It is unlikely that the growth of pupils viewing E.T.V. reproductions will achieve to any greater degree than pupils who would participate in strongly oriented and highly varied instructional media classroom activities.

In-service teachers can use E.T.V. reproductions as sources of inspiration in their own teaching growth. From such reproductions they can acquire ideas on how to demonstrate, illustrate and discuss concepts and ideas. In some cases, teachers may learn how not to do some instructional procedures thereby avoiding unfortunate experiences in the presence of pupils. A repository of such broadcast reproductions could be used during professional growth activities or during teacher-administrator conferences dealing with instructional improvement.

Implications:

During the testing activities and analysis thereof, it became interesting to speculate on the value of final examination testing experiences for poor achievers. The test results collected in the present project indicate that after a period of learning and after a period of forgetting the scores achieved by youngsters did indicate that an invalid procedure may be the custom of final examinations.

During one of the E.T.V. broadcast photographing operations an instructional media specialist observed the proceedings. After the broadcast, he made this comment. "That was a fine program. However, the instructor did not use his instructional media as it should be used." Perhaps E.T.V. reproductions, in any form, should be used to evaluate and improve E.T.V. instruction and instructional personnel. In the course of project photographing there were many instances of errors of ommission and commission during the E.T.V. broadcasts. The use of 35 mm. photographing and taping could be a solution to financially restricted E.T.V. broadcasters who would otherwise be unable to afford video-tape reproduction techniques and facilities for evaluative purposes.

There is some reason to believe that the pacing of E.T.V. reproductions is an advantage over the original broadcast, particularly for any learner who does not fully understand the conceptual procedure being developed during the course of a broadcast. Pacing affords the teacher an opportunity to use the media much in the same way as an auto-instructional device may be used.

The experience gained from the present project suggests that more flexibility should be built into federal guidelines establishing changes in project time and personnel allocations. Inadequate estimates of time and materials are not easily corrected at the local level due to local school budgeting practices and to budgetary committments.

There is little fear that the knowledge by the participants of their association with a federal project might have had any affect on the outcome of the results. Their forehand knowledge was simply an explanation of what they would experience in their classes and how the E.T.V. reproductions were produced.

Recommendations:

A detailed study could be conducted to determine the relative costs of video-tape reproductions vs. 35 mm. filmstrip reproductions. The study should be conducted to examine ideas like: the comparative cost of preparing multiple copies; the financial means of independent school systems and their financial capability to engage in broadcast reproductions of any type.

Careful consideration and thought could be directed to the use of E.T.V. filmstrip reproductions in multi-media and/or auto-instructional procedures. The pacing of reproductions could have decided advantages over live and closed circuit television broadcasts.

Experimentation could be conducted to examine the use of close-up shots of E.T.V. broadcast reproductions to supplement certain types of apparatus demonstrations in large group instruction.

Evaluation by E.T.V. reproductions could be used to improve instructional traits and techniques of E.T.V. instructional personnel. Evaluation could include such personal traits as voice, facial expressions and delivery; and instructional competency such as content, organization, and media use.

Examinations could be directed toward the reproduction, storage and circulation of E.T.V. reproductions by regional, state or university instructional centers serving schools beyond the reach of educational television broadcast reception.

Respective state departments of education should be advised of all federal research projects in order to permit department personnel to serve as consultants, on-site monitors, and visiting advisors to ensure efficient research operations and successful progress.

A worthwhile investigation might be one whereby the instructional validity of administering final examinations to poor achievers would be examined.

Cumulative pupil records should include background data on E.T.V. broadcast observations to enable better teacher planning in preparing instructional activities dealing with this media. The data should be kept for all grades in attendance and should include the specific content of the observations.

SUMMARY

The project was one designed to reproduce E.T.V. presentations from educational television broadcasts into black and white filmstrips syncronized with the original sound on recording tape. A projected plan of 200 reproductions in the subject areas of geography, earth science, climatology, and meteorology was anticipated.

The project was designed to study the effectiveness of E.T.V. reproductions in several types of learning situations with poor achievers by utilizing the advantage of pacing to their ability rather than to the tempo of the original broadcast.

The project was segmented into a two phase operation with some activities of each overlapping into the other. Phase I, completed during the 1965-66 school year, was the production of E.T.V. filmstrip reproductions, syncronized tapes of the original broadcast, unit guides, teacher-use lesson guides and pupil-use study materials.

During Phase II, from September 1966 to February 1967, the emphasis was placed on the utilization of the E.T.V. reproductions in classroom instructional activities. During the study, two matched sections each of poor achievers were selected at random and assigned to one of two sections in grade 7 and in grade 8. One group participated in class activities in a conventional manner. The second group participated in some class activities centered on the use of E.T.V. reproductions.

At the conclusion of Phase II, several evaluative instruments, which were administered during the project, were analyzed in the preparation of this report. The findings were as follows:

E.T.V. filmstrips can be produced on 35 mm. filmstrip sequence photographs with accompanying tape sound reproduction.

Pupils can learn from E.T.V. reproductions and tend to have a more favorable attitude for the subject in which they are used.

E.T.V. reproductions can solve the scheduling conflicts of broadcast schedules and independent school class schedules.

APPENDIX A

Personnel and Work Performances:

Martini, Harry R.	Principal Investigator (A)
Bryant, Harry R.	Principal Investigator (B)
Rechenberg, Paul A.	Research Associate (A)
Smith, George J.	Research Associate (B)
Troy, Kay (Miss)	Librarian
Mundy, Elsie (Mrs.)	Teacher Aide

Principal Investigator A:

1. Administered project activities within the building.
2. Designed report forms and established procedures of operation.
3. Scheduled project work assignments for project personnel.
4. Surveyed E.T.V. programming and prepared E.T.V. reproduction schedules.
5. Maintained files of E.T.V. reproductions (negatives and positives), catalog systems, and teacher-use and pupil-use materials.
6. Edited all tape reproductions.
7. Assisted with editing and syncronizing E.T.V. filmstrip and tape reproductions.
8. Wrote all teacher-use unit guides and lesson guides, and assisted with the writing of pupil-use study guides.
9. Prepared all external and internal reports required for the project.
10. Assisted with E.T.V. program photographing.
11. Provided released time for research associates to perform project tasks.
12. Consulted with school staff personnel and with school district and other specialists on the preparation of the study design.
13. Preparation of the final report.

Principal Investigator B:

1. Assisted with program photographing.

2. Developed negative film; printed and developed positive E.T.V. filmstrips.

3. Maintained dark room laboratory and photographic equipment, including repairs on all photographic instruments and recording machines.

4. Assisted with editing and syncronizing of E.T.V. filmstrip and audio-tape reproductions.

5. Provided released time for research associates to perform project tasks.

Research Associates A and B:

1. Assisted in writing pupil-use study materials.

2. Directed classroom learning activities of the matched groups in E.T.V. reproduction lessons.

Librarian: provided resource lists of supplemental research materials for teacher-use lesson plans.

Teacher Aide: performed clerical tasks as required; including typing materials, filing report forms, and reproducing multilith and spirit duplicator materials.

APPENDIX B

NAME _____ DATES _____ ETV RESEARCH PROJECT WEEKLY PERSONAL TIME & MATERIAL

	8	9	10	11	12	1	2	3	4	Project Time
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										

MATERIALS:

P-1	Photo taking/taping	C-1	Typing
P-2	Photo developing	C-2	Reproduction
P-3	Photo printing	C-3	Test scoring
P-4	Photo drying	C-4	Data processing
R-1	Recording	F-1	Form typing
R-2	Record-editing	F-2	Form preparation
R-3	Record-splicing	F-3	Form proof
E-1	Tape editing	F-4	Form processing
E-2	Film editing	L-1	Planning (general conference)
E-3	Edit proofing	A-1	Administrative Costs (Mr. Bonham, Area Office, Secretary, Library Cataloging)
E-4	Edit composition		
W-1	Writing unit guides		
W-2	Writing quizzes		
W-3	Writing lesson plans		
W-4	Writing study guides		

APPENDIX C

TIME ALLOCATIONS/COST ANALYSIS

MONTH _____

PERSONNEL AND RATE

	Martini	Bryant	Mundy	Smith	Rechenberg				
Week								Total Hrs.	Total Cost
Total Hours									
Total Cost									

APPENDIX D

WEEKLY E.T.V. BROADCAST REPRODUCTION SCHEDULE

WEEK OF _____

Class Pd. Time	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:50 - 9:40	"WIND"				
	9:15-9:40 Bryant				
9:40 - 10:30					
10:30 - 11:20					
11:20 - 11:55					
11:55 - 12:45					
12:45 - 1:35					
1:35 - 2:25					
2:25 - 3:20					

APPENDIX E

TAPE AND FILMSTRIP IDENTIFICATION DATA

TAPE #:_____

NAME OF PROGRAM:_____

LENGTH OF PROGRAM:_____TOTAL MINUTES

SPEED OF TAPE:_____

TAPE SIDE: 1-2 (CIRCLE ONE OR BOTH)

DATE RECORDED:_____

RECORDED BY: MACHINE_____
PERSON_____

INDEX #: FROM_____TO_____

ACCOMPANIES FILMSTRIP #_____TITLED:_____

APPENDIX F

Television, photographic, and audio equipment and materials used for the project.

Item	No. Used	Use(s)
Besler Topcon, Auto 100, Camera, f/2 lens	2	Photographing of E.T.V. broadcasts
Roberts, Model 1057PS, Stereo Tape Recorder, 4-track, stereo-mono, play-record, two speeds, (3.75 x 7.5 i.p.s.), pause-edit control, automatic tape shutoff; two 1/4 track record play and 1/4 track erase heads; four inputs; microphone and radio/phono each channel and four outputs; automatically synchronizing most slide and automatic filmstrip projectors.	1	Tape recording; tape editing; audio/filmstrip advance signal synchronization; classroom instruction.
TE 401, earphone, for Wollensak Tape Recorder	1	Audio listening during taping and during audio/filmstrip advance signal synchronization.
Stereo Headset, Superex, Model ST-M	1	Audio listening during taping and during audio/filmstrip advance signal synchronization.
Magnetic Tape Splicer, Gibson Girl, TS4DLX	1	Tape editing.
Magneraser, Tape eraser, Model 200C	1	Erasing entire tapes in tape editing.
Metal, Tape Recording Reel, Cabinet, Type TR7288	1	Tape Storage
T-1500, Wollensak, Tape Recorder, Monaural play-record	1	Tape recording; tape editing; audio/filmstrip advance signal synchronization; classroom instruction.
T-1515 Wollensak, Tape Recorder, Monaural record-play, stereo play	1	Tape recording; tape editing; audio/filmstrip advance signal synchronization; classroom instruction.

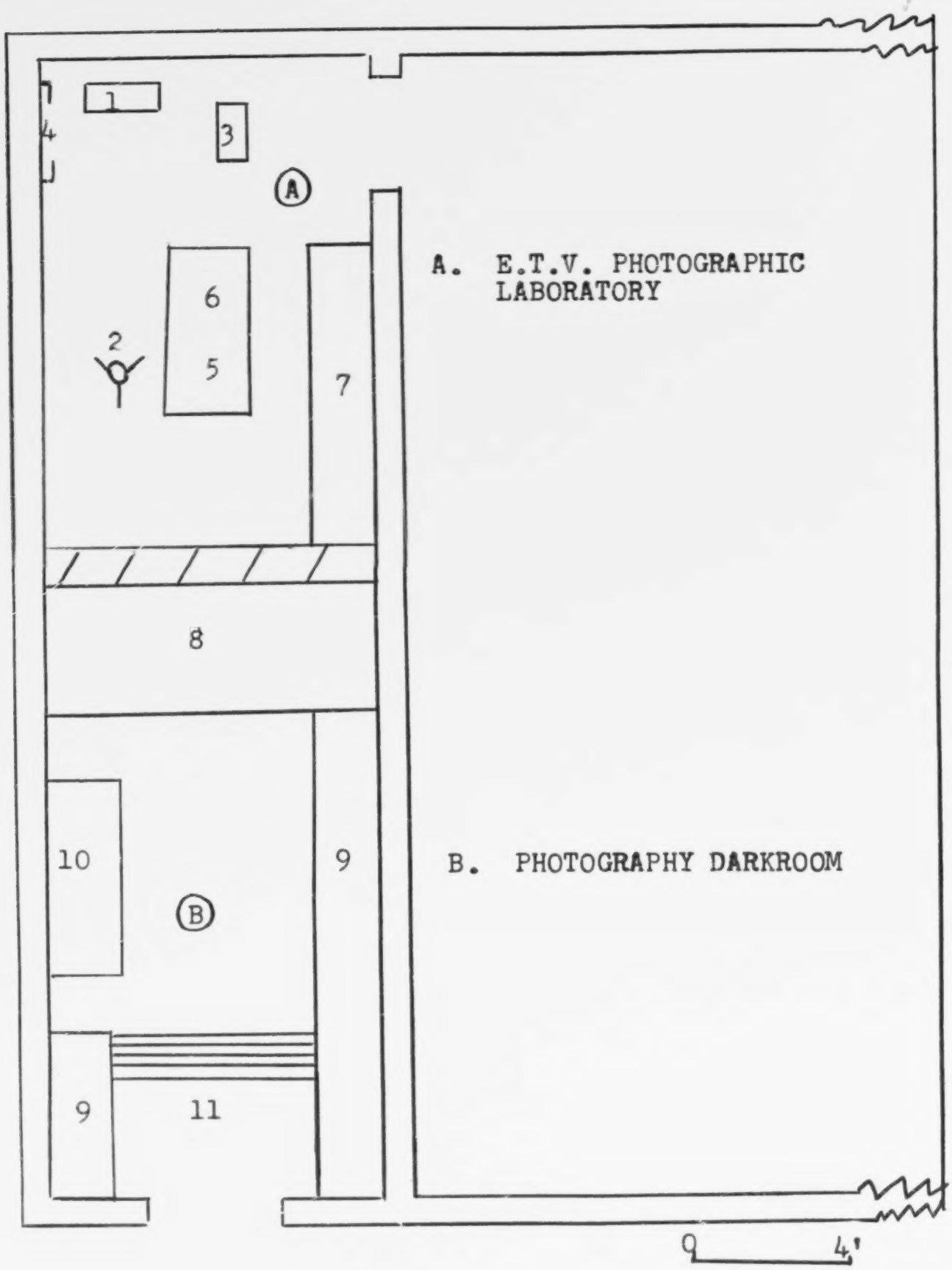
Item	No. Used	Use(s)
Oscillator, key press, home made	1	Audio/filmstrip advance signal placement
Griswold filmstrip splicer, Model R-2	1	Film splicing
Gralab, luminous, universal timer, Model 172	1	Timing negative film development; timing positive printing.
Printer, Oxford, 35 mm, strip printer, Model P	1	Positive filmstrip printing
Filmstrip projector, Viewlex Model V-25P, 500 watt, motor fan cooled 5" F/3.5 Luxtar lens, accomodates automatic slide changer	1	Filmstrip editing; audio/ filmstrip advance signal synchronization; classroom instruction.
Television antenna, outdoor installation	1	E.T.V. broadcast reception.
Pixmobile, Model 1000-15 26" high	1	Storage and transportation of television receiver.
"Standard" filmstrip Library plan #400		Storage and labeling for filmstrip negatives and positives.
Viewlex, filmstrip previewer senior, 7" x 9" screen		Negative filmstrip editing; audio/filmstrip advance signal synchronization/ filmstrip previewing; classroom instruction.
Film dye, Dr. Martin's, synchromatic transparent water color, various colors, 1/2 oz. bottles	(32 color choices)	Film dyeing. Mix 16 oz. water, 1/2 oz. Dr. Martin's film dye, 1/2 oz. 28% acetic acid, 2 drops of Joy detergent. Shake solution. Dip filmstrip in dye and hang to air dry.
Safe-cock, flip lock tripod, for 35 mm camera	1	Camera mounting for photographing. A homemade U-Bar was used to mount one camera above another during photographing operations.

Item	No. Used	Use(s)
Television receiver, Zenith, Model L2705Y, 21" screen	1	E.T.V. broadcast reception.
Darkroom graduates, 32 oz.	2	Film developing
Filter-funnel (filtr-funnl) 16 oz.	1	Film developing
F. R. photographic thermometer	1	Film developing
Safelight, Kodak 2-way safelamp	2	Film developing and printing
Developing tanks	6	Film developing
Film, TX402, Tri-X 135	2200'	Photographic reproduction
Film, Fine grain positive, P651-1	2200'	Positive filmstrips
Filmstrip cans	400	Filmstrip filing

In addition to the television, photographic, and audio equipment and materials used for the project, a vast amount of multilith and ditto reproduction materials and supplies were used.

APPENDIX G

E.T.V. Photographic Laboratory and Photography Darkroom



A. E.T.V. Photographic Laboratory:

1. Television receiver.

2. Two cameras mounted, with a home made U-Bar, on a tripod.

3. Filmstrip projector used for negative and positive filmstrip editing and previewing.

4. Portable screen mounted for filmstrip editing and previewing.

5. Tape recording machine used for E.T.V. broadcast audio reproduction and for E.T.V. broadcast audio/filmstrip reproduction synchronization.

6. Tape recording device used for placement of audible advance signal in audio/filmstrip editing operation.

7. Storage shelves and cabinets for card catalogs, negative and positive filmstrip storage, and equipment storage.

B. Photography Darkroom:

8. Slate-top work area with stainless steel sink.

9. Storage shelves for photographic materials and supplies.

10. Positive filmstrip printer.

11. Negative and positive filmstrip drying lines.

APPENDIX H

UNIT: WHAT IS GEOGRAPHY?

OBJECTIVES:

1. To have the pupils understand the meaning of geography as a discipline of study.
2. To have the pupils appreciate the way in which the geographer works and the forces with which he works.
3. To have the pupils understand the factors that the geographer considers in his study of the earth.
4. To have the pupils gain skill in the viewing of audio-visual instructional materials.
5. To have the pupils gain skill in the techniques of note taking and follow-up classroom learning experiences.
6. To have the pupils appreciate the need for the use of a unique geography vocabulary.

CONTENT:	PROCEDURE:
I. WHAT IS GEOGRAPHY?	
A. Study of man and his environment.	A. Use an overlay to break the word philologically.
B. What is environment? - Man's surroundings.	B. Define by discussion. Site examples in the classroom: chalkboard, desks, chairs, papers, pencils.
C. What is included in man's environment?	C. Develop by viewing ETV reproductions:
1. Water Bodies	1. Rivers and Lakes: Importance to Man. F-76-T20
2. Landforms	2. Mountains of the World. F-100-T25
3. Plant life and crops	3. Economic Importance of Plants. F-108-T27
D. Man's environment is the whole earth.	D. Develop earth ideas by:
1. Point out dissimilarities; compare earth's environments; show man's possible uses of his environment.	1. Viewing ETV reproduction: Looking at the Continents. F-27-T8, and by viewing opaque flat pictures of contrasting areas; deserts, rainforest, mountains vs. plains; etc.
E. Geography has terms which are unique to it and which need to be learned.	E. Develop with ETV reproduction and a word list passed out for year-long pupil reference.
	1. Geographical Terms We Should Know. F-21-T6
	2. Review Geographical Terms chart, wall chart.
II. Pupil selection of regional study sequence.	II. Explain areas of study using a flat wall map. Show by a list on the blackboard the regions to be studied. Pupils select order of study preference; 1st, 2nd, 3rd choices.

PUPIL ACTIVITIES:

1. Notetaking and notebook organization of class study materials.
2. Completion and study of pupil study guides.
3. Observation of E.T.V. filmstrip reproductions and other visual materials.
4. Discussion and participation in discovery activities involving class participation.

INSTRUCTIONAL MATERIALS:

E.T.V. Reproductions:

Rivers and Lakes: Importance to Man F76
Mountains of the World F100
Economic Importance of Plants F108
Looking at the Continents F27
Geographic Terms We Should Know F21

Chart:

Geographical Terms Chart

Opaque/flat Pictures

Classroom Picture Files, (all major areas and countries).

Map

World, political/physical
World, chalk outline

Overlay

Philologic definition of term "Geography".

Reproductions

Study guides to accompany filmstrips. Geographical Terms list.

APPENDIX I

TEACHER GUIDE FOR ETV FILMSTRIP REPRODUCTION

TAPE No. T-20
FILMSTRIP No. F-76

GRADE LEVEL: 4
PRESENTATION TIME: 25 MIN.

January 6, 1966

1. TITLE: Rivers and Lakes: Importance to Man

2. OBJECTIVES:
   A. To have the pupils appreciate the ways in which water is helpful to man.
   B. To have the pupils understand the operation of the water cycle.
   C. To have the pupils understand the role of man in destroying the natural evolution of a river system.
   D. To have pupils appreciate the value of successful water distribution control and conservation.
   E. To have the pupils understand the nature of a river basin and the terms used in identifying water features.

3. KEY TERMS:

evaporation	tributary	barges
water vapor	river system	radar
gravity	Mississippi River	
soil	erosion	
underground water	Colorado River	
divide	irrigate	
river basin	hydroelectric dams	
natural drainage	Norris Dam	
lakes	St. Lawrence Seaway	
streams	tow boat	
reservoir		

4. PROBLEMS TO BE SOLVED:
   A. Why is water important? How do rivers and lakes help make water available to man? How is land and water distributed over the earth?
   B. What is evaporation? Water vapor? How does water get to the earth? What happens to water that falls on the earth?
   C. What are some landforms associated with water and water distribution? What is a divide? A river basin? A reservoir? A tributary? A river system?
   D. How can water be harmful? Why is man chiefly responsible for floods? What kinds of things has man done to upset water drainage and cause floods? How does forestry and farming upset water drainage?
   E. What are some of the chief river systems of the U. S.? How does the Colorado River help man? How are other rivers helping man?
   F. How are dams helpful to man in using rivers? For flood control? Power development? River navigation? Irrigation? For recreation?
   G. How were the Great Lakes formed? What is the St. Lawrence Seaway? What is its purpose?
   H. How do rivers serve man as highways? What are some techniques used to navigate the Mississippi River?

5. CONTENT:
The presentation uses a unique human animation of a water drop to build the program theme. The narrator and animator discuss water. Visuals and discussion highlight the distribution of water, the water cycle, features associated with drainage, and river basins. Water conservation and control techniques are studied. The uses of water are explained and illustrated. Special emphasis is placed on water features like the Mississippi and Colorado Rivers, the T.V.A. area, and the St. Lawrence Seaway.

6. SUGGESTED FOLLOW UP/ENRICHMENT ACTIVITIES:
A. Prepare a map showing the chief river systems of the U. S.; another showing the chief river systems of the world.
B. Study the Tennessee Valley Authority. Prepare a class report on its purposes and its achievements.
C. Sketch a cross-section view of a hydroelectric power dam.
D. Prepare two murals: One to show ways in which water can be harmful and one to show how water can be helpful.
E. Prepare a picture collection to show the ways in which man has disrupted water drainage.
F. Survey your home lawn. List all the ways you can improve your lawn to prevent soil erosion. Try putting some ideas into practice (ask Mom and Pop first).

7. SUPPLEMENTAL TEXT REFERENCES:
**Archer, Rain, Rivers and Reservoirs 628-1 A R

Bertin, Larousse Encyclopedia of the Earth 550 B

*Book of Popular Science

Carhart, Water or Your Life 333.9 C

Carmer, The Susquehanna 974.8 C

Carter, Lower Mississippi 977 C

Cooper, Science in Your Own Backyard 500 C

Trenton, Earth's Adventures 551 F R

Finch, The Earth and Its Resources 551.4 F

Green, Water 333.9 G

Havighurst, Upper Mississippi 977 H

Hogner, Water Over the Dam 627.8 H

Holbrook, The Columbia 979.7 H

Horgan, Great River 978.8 H

Kahn, Design of the Universe 523 K

Lavine, Water Since the World Began 333.9 L

7. Supplemental Text References, cont.

Leopold, Water 551.4 L

Life, The World We Live In 574 L

Riedman, Water for People 628.1 R

Shippin, The Great Heritage (Chapt. 15) 333.7 S

**Smith, The First Book of Water 551.4 S

Thompson, Weather 551.5 T

Toye, The St. Lawrence 917.14 T

Vestal, The Missouri 977 V

Waters, The Colorado 978 W

Wildes, The Delaware 975 W

APPENDIX J

Name_____
Section_____
Date_____

Unit: The Earth's Behavior

How does the earth behave! How does the earth's behavior affect YOU?

I. ROTATION:

A. What is rotation?_____

_____

_____

B. What does the term axis mean?

_____

_____

C. List all the ways which prove the rotation of the earth.

_____

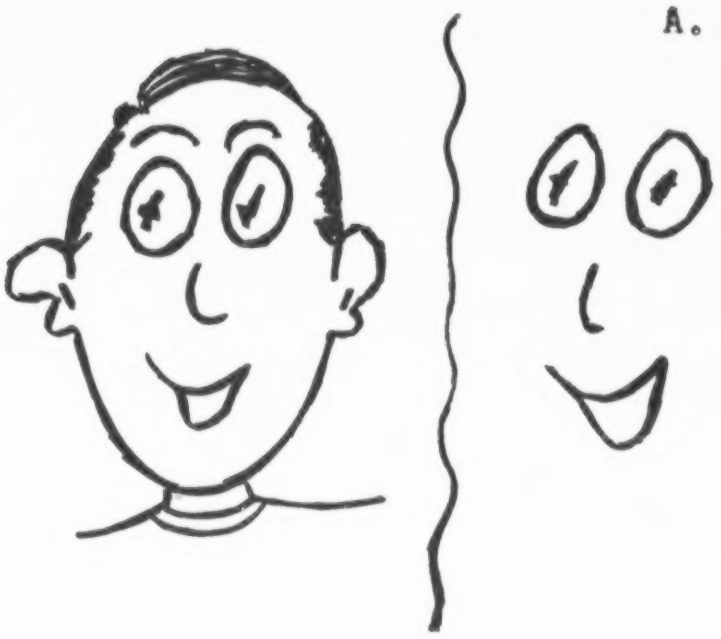
_____

_____

_____

_____

II. D A Y A N D N I G H T



A. What causes day and night? Explain the cause of day and night in a paragraph.

_____

_____

_____

_____

_____

_____

III. ROTATION AND TIME:

A. How can the rotation of the earth help us tell time? Complete the crossword puzzle with the ideas listed below.

<u>DOWN</u>

The spinning of the earth.

A zone in which all times are the same.

The time zone in which Hollywood stars live.

The number of time zones on the earth.

(Crossword puzzle is on separate sheet 2A)

<u>ACROSS</u>

The time zone in which we live.

The line which divides one day from another.

B. Why are the lines separating the time zones not straight but ziggy-zag?_____

_____

_____

C. Each time zone is about _____degrees wide. Why?_____

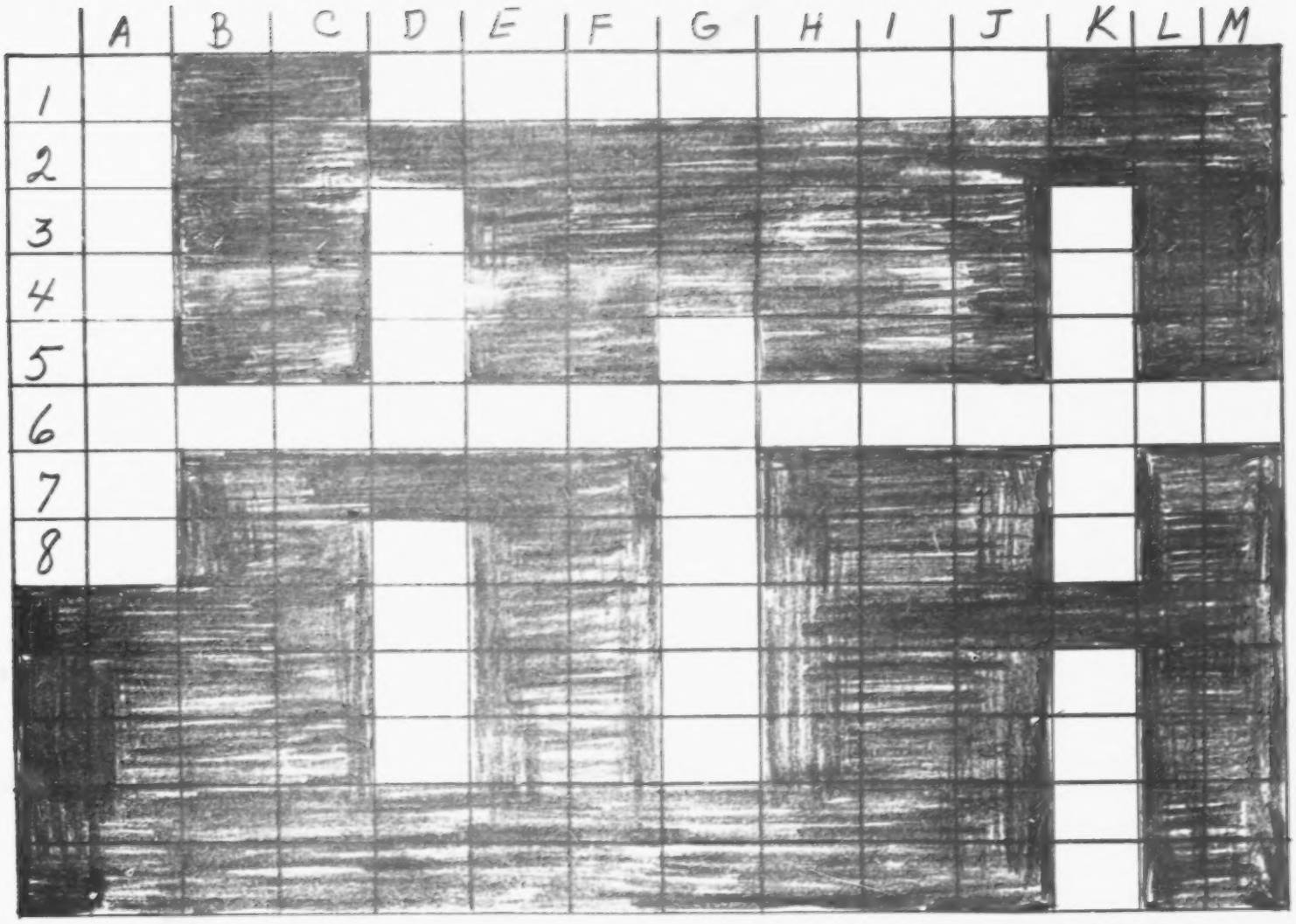
_____

_____

_____

_____ _____

Crossword Puzzle



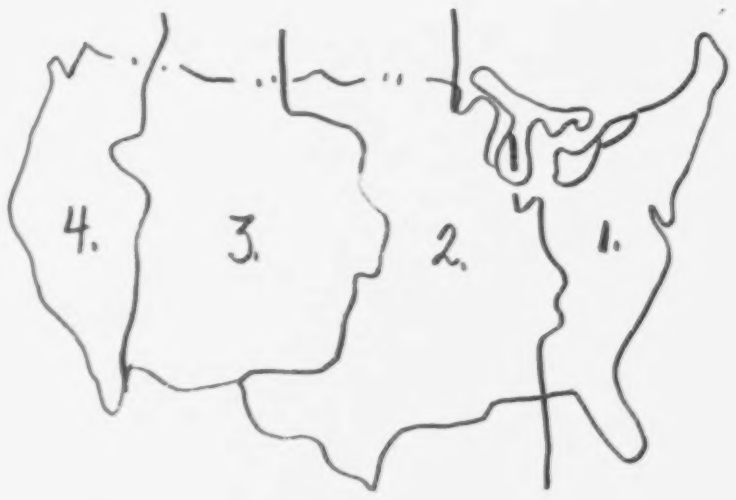
D. Standard time zones: In the blanks below identify each time zone by placing its name after the correct number.

1._____

2._____

3._____

4._____



Standard Time Zones of the United States

APPENDIX K

PUPIL DATA FOR MATCHED PUPILS FOR GRADE 7

Grade 7 - Group 7:

Pupil	Sex	Age (Sept. '66)	I.Q.	Apr.'66 Reading Score	1966 Geography Achievement Scores June	Sept.	Dec.	Dec. '66 Geography Attitude Rating
A	M	13.1	72	3.2	22	14	23	3
B	M	12.5	84	4.0	13	10	18	2
C	M	11.11	81	3.4	11	17	19	1
D	F	11.11	77	4.9	18	15	22	2
E	F	13.5	87	5.4	24	12	26	2
F	F	12.9	86	5.1	29	17	24	2
G	F	11.10	85	4.4	18	11	26	2
H	F	13.3	66	3.6	18	8	22	3
J	M	12.10	90	3.8	17	9	14	2
K	M	13.5	76	4.6	20	8	21	2
L	M	12.0	80	4.6	18	14	25	2

December Geography Achievement Scores

Mean	21.68
Median	20.67
Standard Deviation	3.56

Grade 7 - Group 7':

A'	M	12.5	75	3.9	21	11	25	2
B'	M	12.5	87	4.7	14	11	17	1
C'	M	12.9	81	3.8	17	16	21	1
D'	F	12.3	78	5.6	17	15	36	2
E'	F	13.2	86	5.3	23	16	23	2
F'	F	12.4	82	3.6	25	9	17	2
G'	F	13.6	85	4.5	16	12	22	1
H'	M	12.8	66	3.6	13	11	17	2
J'	M	11.10	84	3.4	11	14	23	1
K'	F	12.8	72	4.5	15	14	19	2
L'	M	12.7	83	4.9	22	15	27	3

December Geography Achievement Scores

Mean	22.85
Median	22.00
Standard Deviation	4.98

Correlation Coefficient +.303
December Scores Groups 7 and 7'

PUPIL DATA FOR MATCHED PUPILS FOR GRADE 8

Grade 8 - Group 8:

Pupil	Sex	Age (Sept. '66)	I.Q.	Apr.'66 Reading Score	1966 Geography Achievement Scores June	Sept.	Dec.	Dec. '66 Geography Attitude Rating
M	M	14.0	92	4.5	18	14	21	2
N	M	13.0	94	5.1	15	11	13	2
P	M	13.6	92	5.9	25	20	18	2
R	M	13.6	89	4.8	21	12	16	2
S	M	14.1	75	5.0	19	25	19	1
T	F	12.10	90	4.9	29	21	27	3
U	M	14.7	77	4.9	18	20	13	5
V	F	13.2	101	4.5	20	22	26	3
W	M	13.10	82	5.7	21	15	27	1
X	M	14.7	82	5.7	23	15	14	2
Y	F	13.0	85	4.4	18	17	17	2

December Geography Achievement Scores

Mean	19.32
Median	18.00
Standard Deviation	5.26

Grade 8 - Group 8':

M'	M	14.6	94	4.6	23	27	30	3
N'	M	13.1	90	5.3	23	13	26	2
P'	M	13.7	89	5.6	29	27	32	2
R'	M	13.2	96	4.9	30	19	20	3
S'	M	14.6	77	5.3	13	23	14	2
T'	F	14.6	86	5.2	26	19	30	2
U'	M	14.1	76	4.5	16	21	20	2
V'	F	13.2	96	5.6	20	22	24	3
W'	M	15.0	80	4.5	21	18	15	3
X'	M	13.1	96	5.4	29	17	25	2
Y'	F	14.3	82	4.4	13	22	16	3

December Geography Achievement Scores

Mean	22.59
Median	23.50
Standard Deviation	5.85

Correlation Coefficient +.273
December Scores Groups 8 and 8'

APPENDIX L

BRANDYWINE ACHIEVEMENT TEST IN GEOGRAPHY FOR SECONDARY SCHOOLS

Copyright 1962 by
John A. Bonham, B.S., M.A. Harry R. Martini, B.A., M.Ed.

FORM A

PART I

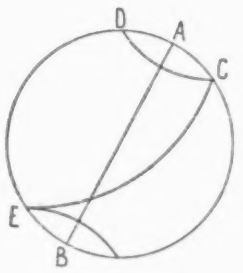
The first part of this test is designed to determine the pupil's familiarity with: geography vocabulary; rotation and revolution of the Earth and the effect on ocean currents, seasons and tides; and basic information about climatic regions of the world.

Directions: Read through each of the following items. Select the phrase which completes the sentence correctly then write the letter next to it in the proper place on the answer sheet. All answers should go on the answer sheet. Do not write anything on this paper.

1. Geography is
   A. the learning of exports and imports of various countries.
   B. the study of the races of man.
   C. the relationship between man and his natural environment.
   D. the study of regions of the world.

2. Latitude is
   A. circular lines on the Earth.
   B. lines circling the earth from pole to pole.
   C. the distance measured in degrees east and west of the prime meridian.
   D. the distance measured in degrees north and south of the equator.

3. Longitude is
   A. line D - C
   B. line C - E
   C. line A - B
   D. None of these.

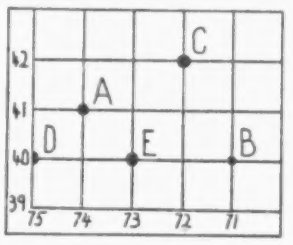


4. The distance between any two degrees of latitude is nearly
   A. 6.9 miles
   B. 69 miles
   C. 690 miles
   D. 6900 miles

5. The distance between any two degrees of longitude
   A. decreases as one moves away from the equator.
   B. is always the same no matter how far one is from the equator.
   C. increases as one moves away from the equator.
   D. is always about 69 miles and never changes.

6. Philadelphia, Pennsylvania, is 40° north. Philadelphia is about how many miles north of the equator?
   A. 27,600 miles
   B. 2,760 miles
   C. 34,500 miles
   D. 3,450 miles

7. Philadelphia, Pennsylvania, is 40° north latitude and 75° west longitude.
   Which letter on the map shows Philadelphia?

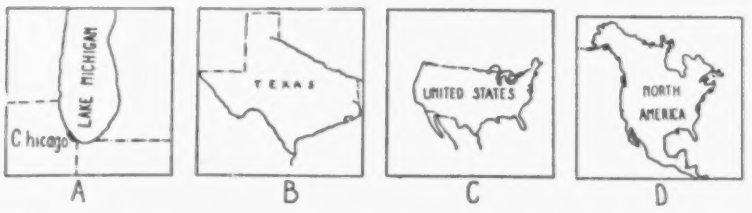


8. The two chief tools of the geographer are the
   A. chart and diagram.
   B. diagram and map.
   C. map and globe.
   D. globe and chart.

9. The Earth is round; therefore the best tool to show the Earth is a
   A. diagram.
   B. map.
   C. globe.
   D. chart.

10. Any world map is
    A. never wrong.
    B. seldom wrong anywhere.
    C. always wrong in some places.
    D. none of the above is correct.

11. The most accurate type of map is one which might show



12. The Earth moves on its axis: this movement is called
    A. rotation.
    B. revolution.
    C. expansion.
    D. contraction.

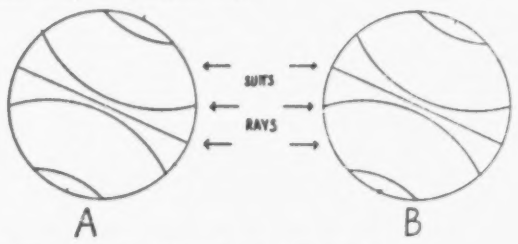
13. The Earth revolves
    A. on its axis once a year.
    B. in its orbit once a day.
    C. on its axis once a day.
    D. in its orbit once a year.

14. As one goes farther from the equator, the summer days are going to
    A. be the same length.
    B. be shorter in length.
    C. be longer in length.
    D. be dark.

15. The most important cause of day and night is
    A. the moon's gravitational pull.
    B. revolution of the Earth and the tilt of its axis.
    C. the magnetic attraction of the North Pole.
    D. the rotation of the Earth.

16. The most important cause of seasons is
    A. the moon's gravitational pull.
    B. revolution of the Earth and the tilt of its axis.
    C. the magnetic attraction of the North Pole.
    D. the rotation of the Earth.

The drawing below should be used to answer questions 17, 18, and 19.

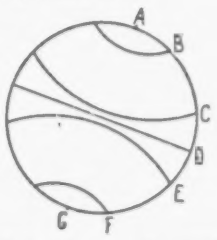


17. The Earth is tilted on its axis
    A. 66½°.
    B. 23½°.
    C. 90°.
    D. 0°.

18. Diagram "A" represents the beginning of which season in the northern hemisphere?
    A. fall.
    B. winter.
    C. spring.
    D. summer.

19. Diagram "B" represents the beginning of which season in the southern hemisphere?
    A. fall.
    B. winter.
    C. spring.
    D. summer.

The drawing below should be used to answer questions 20, 21, 22, 23, and 24.



20. Line "B" on the above drawing represents the
    A. Equator.
    B. Antarctic Circle.
    C. Tropic of Cancer.
    D. Arctic Circle.

21. Line "C" is 23½° north because
    A. line "D" is 90°.
    B. it bisects line "A-G".
    C. it is above line "F".
    D. the Earth tilts on its axis.

22. At line "D" is
    A. the tropic of Cancer.
    B. the vertical rays of the sun twice a year.
    C. the Antarctic Circle.
    D. the summer solstice in the Northern Hemisphere.

23. Line "C" is latitude
    A. 23½°N.
    B. 23½°S.
    C. 66½°N.
    D. 66½°S.

24. Line "F" is
    A. a point where there is daylight 24 hours once a year.
    B. 23½° south latitude.
    C. the Tropic of Capricorn.
    D. a region of Subtropical Lows.

---

25. The Westerly Wind is a wind belt in which the winds
    A. blow from the west to the east.
    B. blow from the east to the west.
    C. form a calm belt.
    D. cause a high pressure area.

26. The Northeast Trades is a wind belt in which the winds
    A. blow to the southwest from the northeast.
    B. blow from the southeast to the northeast.
    C. produce a convectional rainfall.
    D. cause a low pressure area.

27. The Tropical Rainforest climate is
    A. one where there is dense broad-leaf vegetation, highly leached soils and high temperatures all year.
    B. found in the low latitudes, has a wet and dry season and the chief vegetation is grass.
    C. one where you find permafrost, short stunted vegetation and very light precipitation.
    D. one of mild temperatures for its location, fog, lush green vegetation and precipitation due partly to the Westerlies.

28. The Humid Subtropical climate is
    A. one where there is dense broad-leaf vegetation, highly leached soils and high temperatures all year.
    B. found in the tropics, has a wet and dry season and the chief vegetation is grass.
    C. one where you would find xerophytic vegetation and a wet and dry season and mild temperatures.
    D. one of high temperature and humidity, possible frosts and some leaching.

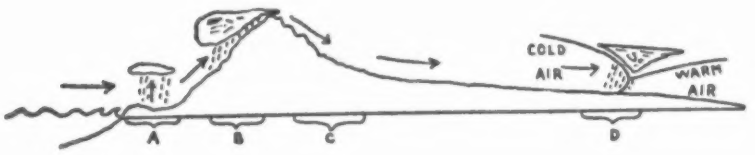
29. The Mediterranean climate is
    A. one where you would find short stunted coniferous forests, an extremely short growing season and thin acid soils of poor fertility.
    B. one where you would find shiny leaf vegetation, wet winters, dry summers and mild temperatures.
    C. one where you find permafrost, short stunted vegetation and very light precipitation.
    D. found in the tropics, has a wet and dry season and the chief vegetation is grass.

30. The Taiga climate is
    A. one where you find short stunted coniferous forests, an extremely short growing season and thin acid soils of poor fertility.
    B. found in the tropics, has a wet and dry season and the chief vegetation is grass.

C. one where you find permafrost, treeless, and very light precipitation.
D. one which is found in the eastern part of continents, has four seasons and mixed vegetation.

31. A Desert Climate is
A. one where you would find short stunted coniferous forest, an extremely short growing season and thin acid soils of poor fertility.
B. found in the tropics, has a wet and dry season and the chief vegetation is grass.
C. one where rainfall is scarce and unreliable, hot days and cold nights, xerophytic vegetation.
D. one where rainfall is 10 to 20", vegetation is mainly grass, there are extreme differences between summer and winter temperatures and where soils are very fertile.

The drawing below should be used to identify the following types of rainfall.



32. Orographic rainfall.

33. Convectional rainfall.

FORM A

PART II

The second part of this test is designed to measure the pupil's ability to apply the fundamental skills included in Part I.

Directions: Read through each story carefully. Following the story are questions about that story. Select the best answer and write the letter next to it in the space provided on the answer sheet.

Lulu Nangali has probably seen more wild animals than you have ever seen in a zoo. She could tell you many interesting things about their peculiar habits. Little Lulu lives with her family in a small, neat round house made of tall grass and reeds. The Nangali's house is located in a village where all ten houses are arranged in a circle surrounded by a high fence of thorns. This is called a kraal. Lulu's father and mother have warned her many times not to stray outside the kraal unless one of her parents goes with her. Lulu's father spends most of his time during the day tending to his diseased and poorly fed herd of 5 cattle and a few goats. He does not dare leave them for fear they might be attacked by wild beasts and Lulu's brother was killled recently by one. All of the men bring their flocks back to the village for safety during the night. Sometimes Mr. Nangali will kill a wild animal with his spear to supply his family with meat. Lulu's mother takes care of their small garden in which she tries to grow a little millet, tobacco and potatoes. Occasionally an elephant may destroy the small garden. The Nangali family is not sure that they will always have enough to eat because there may or may not be enough precipitation during the rainy season to make the garden grow. During the dry season, great fires sometimes break out in the grass which covers much of the countryside. These fires can be destructive because they kill the grass on which the herds graze. In addition, the many wild animals are forced to flee and this reduces the meat supply for the family.

Sometimes little Lulu is dressed up in her only best dress which is made of cotton and is a very bright color. The occasion is a trip to a coastal village some distance away where her father may trade some tobacco, a cow or a goat for something which he badly needs.

34. Fires are a major problem for these people because
A. they do not have matches and so they must keep a fire all the time.
B. the houses are made of reed.
C. people do not like the hot temperatures.
D. fires show the anger of the gods.

35. Villages are small and widely scattered partly because
A. of tribal wars which wipe out whole villages.
B. villages are limited to the very few roads.
C. people do not like the hot temperatures.
D. conditions in the area will not support a large population.

36. Lulu's diet is limited to a few garden vegetables, milk and wild game because
A. the precipitation comes in certain times of the year and in uncertain amounts.
B. she cannot tell when the rains are coming.
C. CARE packages cannot be sent to hot, dry areas.
D. they haven't been taught to grow other kinds of crops.

37. The Nangali family lives by very meager means because
A. the United Nations does not know about these people.
B. these people are not interested in improving themselves.
C. their war-like attitude prevents them from getting help.
D. they must live on those things which their natural environment provides for them.

38. Living under such conditions, does Lulu
A. accept come what may?
B. worry constantly about what will happen to her?
C. worry herself into a state of spiritual excitement?
D. thoughtlessly go about having fun?

39. Lulu's house and dress are comfortable for her because
    A. she does not feel the cold.
    B. cotton insulates the body and reed insulates the house.
    C. cold spells are so infrequent that people do not worry about them.
    D. the house and her dress are most satisfactory for the temperatures under which she lives.

The little town of Browning is located hundreds of miles from the sea. Seventy-five miles outside the town of Browning you would find a small sign beside the road pointing to the Brown home. Should you turn into the lane you would find it necessary to travel 2 miles to get to the house. Mr. Brown owns 5,000 acres of land which is considered to be a medium-sized ranch. Mr. Brown has three sons — all in their teens. The three Brown boys and their father spend most of their time during the summer looking after their 250 head of cattle. The cattle graze on the sparse grass cover. The cattle must be moved frequently so they can eat fresh grass. Mr. Brown would like to raise a few crops on his land but there is not enough rainfall and irrigation water would cost too much due to the long distance it would have to be piped.

During the winter the cattle must be watched carefully. Should a blizzard strike, the cattle must be herded into a valley or some other shelter as a protection against the cold wind. Also during the winter they must be fed hay which Mr. Brown must buy. Winters come early for the Browns. While they do not have to worry about large amounts of snow, the danger lies in drifting due to high winds. The temperatures are always very low during this season so that the family stays close to the furnace in their small frame house.

The Browns are a healthy family—seldom sick. The sky is usually beautiful and clear and the air is dry, cool, and brisk during the summer. There is little precipitation so that the family can be outside most of the time if they like. The Browns drive into Browning once or twice a week to buy groceries and perhaps see a movie. They do not consider the 75 mile trip any inconvenience. The roads are good and fairly level, there is little traffic and there are few houses to pass. Their visit to town is one of the best opportunities to see friends and neighbors who may also be shopping.

---

40. The Browns have few close neighbors because
    A. it is too cold for many people to live in this area.
    B. the people do not like to live where traveling is difficult on poor roads.
    C. the people fear the cold winter blizzards.
    D. the ranches must be large in order for the people to produce enough to make a living.
41. The Brown ranch must have much acreage because
    A. the father must find plenty of work for his three sons.
    B. cattle like to roam over great areas.
    C. they inherited this ranch.
    D. the sparse amount of grass will not support enough cattle on a small ranch for the family to make a living.
42. The Brown ranch gets little precipitation:
    A. most precipitation comes in the winter.
    B. it lies very distant from moisture-bearing winds.
    C. most of the precipitation evaporates before it falls on the ground.
    D. the ranch is in the path of the northeast trades.
43. During the long winter months the cold winds are a problem because
    A. the Browns cannot store enough fuel to last through the winter.
    B. they harm and sometimes kill the cattle in addition to causing snows to drift.
    C. they bring large amounts of snow.
    D. the Browns sometimes cancel trips to town and miss seeing their friends.
44. The Brown ranch is neither irrigated nor cultivated because
    A. digging irrigation ditches over long distances would be too expensive for the Browns.
    B. irrigation water would evaporate before they could get it to the fields.
    C. irrigation ditches require too much attention for the three sons.
    D. the Browns do not want to dig the irrigation ditches.
45. The Brown's total income comes from the sale of cattle because
    A. meat always brings a high price.
    B. the unirrigated land will only support cattle grazing.
    C. they belong to a cooperative association which will not permit them to do anything else.
    D. they dislike doing anything else.
46. The Browns buy and store hay for the winter feeding because
    A. they do not like to haul hay from Browning during the cold winter.
    B. hay can be purchased more cheaply during the summer.
    C. the lack of rainfall does not permit them to grow enough winter feed.
    D. they are too busy caring for the beef cattle during the summer to worry about winter feed.

"What a catch!" whispers Eric to his father who is fishing nearby through a hole cut in the ice. The father is more interested in catching enough fish for the two of them and getting home, not in the size of the small fish his son just caught. The father knows that there isn't time for much more fishing before the very bad winter weather comes when they will have to depend on hunting game for food. Hunting is more important to Eric and his father, for by hunting they satisfy many needs: they get food for the winter; they get oil for the lamp; they get hides for clothing; they get gut for thread and they get bones and horns for needles, utensils and ornaments. Hunting is difficult. It requires several days' search through blinding snow and bitter cold winds. Sometimes the game may hear the hunters moving along the crackling snow and flee out of range of the arrow or spear into the snow-white horizon. After a successful kill, the meat is taken back by dogsled to their small sod home. Here the meat is carved and the cuts sor-

ted. Some cuts are eaten raw immediately, some are thrown to the half starved dogs and the remainder are stored in a safe and frigid place. The animal fat is boiled into oil which will serve as fuel for their one soapstone lamp. Choice bones are sharpened with which they can sew clothing from the animal hides. Since Eric's mother died from tuberculosis several years ago, he and his father have had to learn the difficult task of chewing the hides which is necessary to make them soft and wearable. Eric doesn't like chewing hides and he often wishes his mother were still alive to do her customary share of work.

---

47. Life is a constant struggle for Eric and his father because
    A. they miss Eric's mother.
    B. fish can be caught only during certain times of the year.
    C. the snow covers plant crops all the time.
    D. cold temperatures restrict plant and animal life.

48. Eric and his father live almost entirely on meat because
    A. they can only eat what is available.
    B. they have not learned how to cook other foods.
    C. the wildlife eats all available plants.
    D. eating plants is against their religious belief.

49. Eric, like his father, misses his mother because
    A. he was very fond of her.
    B. they must now do her normal share of chores.
    C. they do not like eating raw meat which she used to cook.
    D. she used to entertain them during the long winters.

50. The dog sled provides Eric and his father with the chief means of transportation because
    A. the dogs are obedient since they like the raw meat that is fed to them.
    B. being old fashioned, they do not like modern means of transportation.
    C. it is the best way of traveling.
    D. it was a difficult job to train the dogs and they do not want to give them up.

51. Life would be tough for Eric and his father without wild animals because
    A. everything they need comes from wild animals.
    B. hunting occupies their time.
    C. hunting keeps them in excellent physical condition.
    D. they have not learned to catch birds yet.

Through the dense fog, Meredith Morgan walks over the cobble-stone streets on his way to school. The day is a dreary one and will remain dreary except for the few short times the sun will break through the overcast sky. The sky is always overcast because the winds blowing from the west bring moisture which is picked up from the huge body of water offshore. Meredith is using the same streets his father used in going to work several hours before. Meredith's father used them to find his way to the mines. The coal mine where Mr. Morgan works is an old shaft mine with very deep shafts. Work is hard and dangerous since the mines are so deep that breathing is difficult. Some of the coal seams are very thin, making work hard since little machinery can be used. The coal from the mines is used by the industry in town. In fact, Meredith's brother, Owen, uses some of this coal where he works. Owen Morgan, who did not want to be a miner like his father, was lucky to get a job with a local shipbuilding company. The company, like the mine, is an old one. It started in olden days when coal was used to fuel ships. Today, however, little coal is used since it has been largely replaced by petroleum. Most of the coal mined today is either exported abroad or sent by ship or train to far-off towns of Meredith's homeland. Meredith thinks his brother is lucky to be a shipbuilder since there is little reason for shipbuilding companies to stay in his town except for the shipbuilding skills people have learned which they use in making good vessels. Owen often worries that the shipbuilding company might leave and that he would have to go and work in the mine where his father works, a thought he dislikes terribly because he dreads the hard work and dangers of mining. Meredith spends much time thinking of what he will do in a few years; "Should I, like my father, be a miner where the sun is always absent in the dark, damp, divided mine, or should I, like Owen, spend my life in the shipyards where the consistently damp, drizzly days are endless."

---

52. Most of the days in this town are damp and dreary because
    A. it is too far north to get the direct rays of the sun.
    B. the dust and smoke from the industries block out the sun.
    C. the moisture in the Westerly winds cools and condenses as it moves across the land.
    D. the cold winds moving from the land to the sea gather moisture.

53. Shipbuilding remains one of the major industries because
    A. the ships built here are in great demand due to their popular design.
    B. the people are fond of boats and use them for pleasure.
    C. labor is cheaper here than in most other shipbuilding centers.
    D. the people have learned shipbuilding skills and it is one of few job opportunities open to them.

54. There is a lack of machinery used in mining because
    A. the thin seams make machinery impractical.
    B. the company is old and cannot afford to buy machinery.
    C. machines are not made locally and must be imported from great distances.
    D. most of the men do not know how to use machinery.

55. The cost of coal from these mines would be high because
    A. there is great local demand for it.
    B. it is an expensive grade of coal.
    C. they can only produce so much.
    D. it is difficult to mine the coal.

56. Shipbuilding is a year-round industry because
    A. the demand for ships is great since they do not last long.
    B. the temperature is mild and it is possible to work out-doors the year round.
    C. the people get bored with the dreary, damp, cloudy days.
    D. it is the only work available all year.

57. Meredith worries constantly about his future because
    A. the old mine could run out of coal and the shipbuilding company could move to a more desirable location.
    B. he is afraid of working near the water in the shipyards.
    C. he is afraid that he is not learning enough at school to be successful at any job.
    D. he does not understand how to mine coal.

Beside the busy highway sits a large attractive two-story grey stone house with green shutters. The neat yard, with many flower beds and a large vegetable garden, is surrounded by a freshly painted white picket fence. A short distance behind the house is a large stone barn at the end of which is a silo. Surrounding the barn are small buildings which house the farm machinery, the new family car, the chickens and hogs. Many passing motorists admire the neat and well-kept appearance of the farm which reflects prosperity. Some motorists note that the name on the mail box is "Pfitzenmeyer".

Gideon Pfitzenmeyer inherited this 200 acre farm from his father because he was the oldest of four boys. His three brothers also own farms nearby which they bought. Most of Gideon's friends have large families, so the family of six children (3 boys and 3 girls) is not unusual. These six children are all well-fed and well cared for. Mr. Pfitzenmeyer intends to keep his farm in excellent condition by rotating his tobacco, corn, wheat, alfalfa and oats so that the two robber crops will never have a chance to ruin his soil. It is seldom difficult to get the three boys to work in the fields. They enjoy driving the tractor to plow, cultivate, spread fertilizer or cut the alfalfa. Their new combine makes the harvesting and thrashing of the spring wheat a fairly easy task. The mechanical corn picker makes easy work of the corn harvesting.

Mr. Pfitzenmeyer does have difficulty getting his three boys out of bed at 5 o'clock on cold, winter mornings to help feed and milk the 40 head of Guernseys. Some of these Guernseys have won first prizes at local fairs. This early morning task is well planned. Two boys get fodder, grown during the summer, from the silo to feed the cows. One boy helps his father wash the cows and attach the milking machines. The milk is piped directly from the cow to a mechanical cooler where it is kept until collected by the milk truck three times a week and hauled to a nearby city. Mr. Pfitzenmeyer also has trouble getting his boys out of bed when there is tobacco to be transplanted from the seed bed to the field; when the tobacco must be cultivated, or, finally, when the crop must be cut by hand and taken to the drying barn. Working with tobacco is hard work.

While the boys are helping their father in the fields, the three girls must help their mother prepare 3 big meals a day, wash the dishes, wash clothes and clean the house. Several hours a day are spent outside caring for their healthy vegetables which will be canned or frozen for winter. Great pride is taken in keeping the vegetable garden and flower beds free from weeds. They are glad their father is able to sell a variety of farm products throughout the year so they always have a comfortable home and nice clothes.

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58. Mr. Pfitzenmeyer's income
    A. is uncertain all year.
    B. is better during the summer than in winter.
    C. is reliable all year.
    D. comes from just selling tobacco.

59. The Pfitzenmeyers own many labor-saving machines because
    A. they are lazy.
    B. the farm is too large to use horses.
    C. the farm income is great enough to buy and maintain machinery.
    D. they were able to buy them second-hand at a cheap price.

60. The Pfitzenmeyers have no difficulty selling their farm products because
    A. they can be transported easily and quickly to the markets in nearby cities.
    B. this is the only farm in the vicinity.
    C. most of the neighboring farmers produce other kinds of crops.
    D. these people sell their products at very cheap prices.

61. It is possible for the Pfitzenmeyers to grow a variety of crops with little risk because
    A. there is little danger of drought and frost during the growing season.
    B. floods are unlikely to occur.
    C. there is a year-round growing season.
    D. they can use the machinery to cultivate poor areas quickly.

62. The Pfitzenmeyer farm is not extremely large because
    A. they cannot buy additional land from their neighbors.
    B. they sold some of the land for a factory site.
    C. they cannot afford to buy more machinery to care for more land.
    D. the good and adequate soil and the length of the growing season permit them to grow a variety of crops in sufficient quantity for enough income.

Second Printing

Brandywine Achievement Test, Box 526, Coatesville, Pennsylvania

APPENDIX M

BRANDYWINE ACHIEVEMENT TEST IN GEOGRAPHY FOR SECONDARY SCHOOLS

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John A. Bonham, B.S., M.A. Harry R. Martini, B.A., M.Ed.

FORM B

PART I

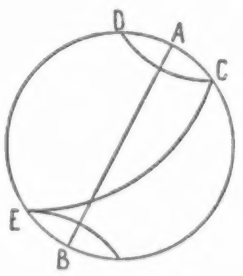
The first part of this test is designed to determine the pupil's familiarity with: geography vocabulary; rotation and revolution of the Earth and the affect on ocean currents, seasons and tides; and basic information about climatic regions of the world.

Directions: Read through each of the following items. Select the phrase which completes the sentence correctly then write the letter next to it in the proper place on the answer sheet. All answers should go on the answer sheet. Do not write anything on this paper.

1. Geography is
   A. a description of the Earth's surface.
   B. the learning of people, places and things.
   C. the study of regions of the world.
   D. the relationship between man and his natural environment.

2. Latitude is shown by

   A. Line C - D
   B. Line D - E
   C. Line A - B
   D. None of these.



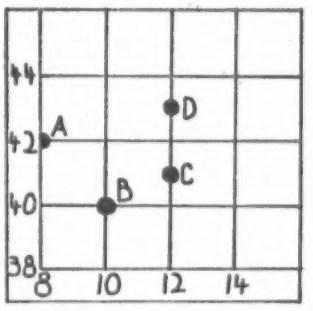
3. Longitude is
   A. circular lines on the Earth.
   B. parallel lines circling the Earth.
   C. the distance measured in degrees east and west of the prime meridian.
   D. the distance measured in degrees north and south of the equator.

4. The distance between any two degrees of latitude is nearly
   A. 6.9 miles. C. 690 miles.
   B. 69 miles. D. 6900 miles.

5. The distance between any two degrees of longitude
   A. decreases as one moves away from the equator.
   B. is always the same no matter how far one is from the equator.
   C. increases as one moves away from the equator.
   D. is always about 69 miles and never changes.

6. Chicago, Illinois, is about 42° north. Chicago is about how many miles north of the equator?
   A. 9,108 C. 6,100
   B. 2,898 D. 3,312

7. Rome, Italy, is 41° north latitude and 12° east longitude. Which letter on the map shows Rome?

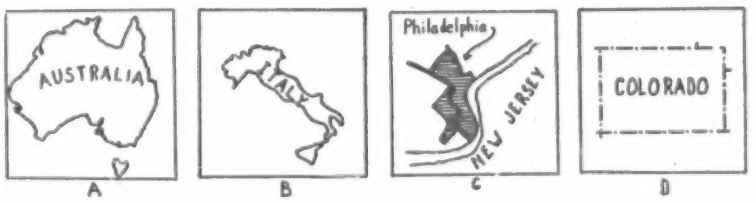


8. The two chief tools of the geographer are the
   A. chart and diagram.
   B. diagram and map.
   C. map and globe.
   D. globe and chart.

9. The best tool to show our round Earth is a
   A. diagram. C. globe.
   B. map. D. chart.

10. Any world map is
    A. never wrong.
    B. seldom wrong anywhere.
    C. always wrong in some places.
    D. none of the above is correct.

11. The most accurate type of map is one which might show

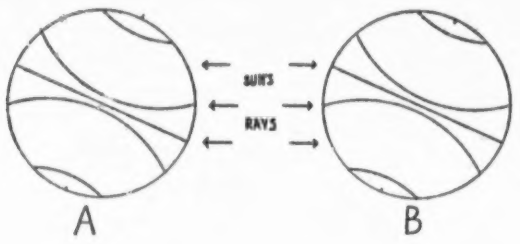


12. The Earth turns on its axis; this movement is called
    A. rotation. C. expansion.
    B. revolution. D. contraction.

13. The Earth moves around the sun
    A. on its axis once a year.
    B. in its orbit once a day.
    C. on its axis once a day.
    D. in its orbit once a year.

14. The most important cause of seasons is
    A. the moon's gravitational pull.
    B. revolution of the earth and the tilt of its axis.
    C. the magnetic attraction of the North Pole.
    D. the rotation of the Earth.

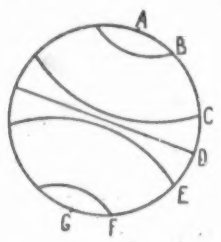
The drawing below should be used to answer questions 15 and 16.



15. The Earth is tilted on its
    A. Equator.
    B. Prime Meridan.
    C. Solstice.
    D. Axis.

16. Diagram "B" represents the beginning of which season in the southern hemisphere?
    A. fall.
    B. winter.
    C. spring
    D. summer.

The drawing below should be used to answer questions 17, 18, 19, 20 and 21.



17. Line "F" on the drawing represents the
    A. Equator.
    B. Antarctic Circle.
    C. Tropic of Cancer.
    D. Arctic Circle.

18. Line "E" is 23½° south because
    A. line "D" is 90° north.
    B. it bisects line A-G.
    C. it is above line 'F."
    D. the Earth tilts on its axis.

19. At line "D" is
    A. the Tropic of Cancer.
    B. the verticle rays of the sun twice a year.
    C. the Antarctic Circle.
    D. the summer solstice in the Northern Hemisphere.

20. Line "F" is latitude
    A. 23½° north.
    B. 23½° south.
    C. 66½° north.
    D. 66½° south.

21. Line "B" is
    A. a point where there is daylight 24 hours once a year.
    B. 23½° south latitude.
    C. the Tropic of Capricorn.
    D. a region of subtropical lows.

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22. The Northeast Trades is a wind belt in which the winds
    A. blow from the west to the east.
    B. blow from the east to the west.
    C. form a calm belt.
    D. cause a high pressure area.

23. The Subtropical High Pressure Area
    A. is one where we find dense vegetation.
    B. is found in the high latitude regions.
    C. causes daily orographic precipitation.
    D. is one of cool dry descending air.

24. The Savanna Climate is
    A. one where you would find short stunted coniferous forests, an extremely short growing season and thin acid soils of poor fertility.
    B. found in the tropics, has a wet and dry season and the chief vegetation is grass.
    C. one of mild temperatures for its location, fog, lush green vegetation and precipitation due partly to the westerlies.
    D. one of high temperature and humidity, possible fronts and some leaching.

25. The Marine West Coast Climate is
    A. one where there is dense broad-leaf vegetation, highly leached soils and high temperatures all year.
    B. one where you would find xerophytic vegetation, a wet and dry season and mild temperatures.
    C. one of mild temperatures for its location, fog, lush green vegetation and precipitation due partly to the westerlies.
    D. one of high temperature and humidity, possible frosts and some leaching.

26. The Humid Continental Climate is
    A. one where there is dense broad-leaf vegetation, highly leached soils and high temperatures all year.
    B. found in the tropics, has a wet and dry season and the chief vegetation is grass.
    C. one where you would find xerophytic vegetation, a wet and dry season and mild temperatures.
    D. one which is found in the eastern part of continents, has four seasons, and mixed vegetation.

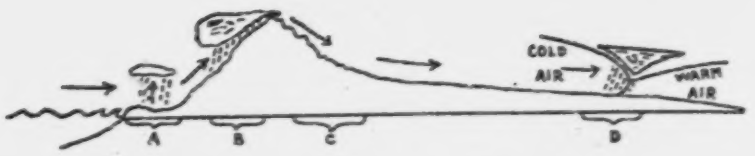
27. The Tundra Climate is
    A. one where there is dense broad-leaf vegetation, highly leached soils and high temperatures all year.
    B. one where you would find xerophytic vegetation, a wet and dry season and mild temperatures.
    C. one where you find permafrost, scrub vegetation and very light precipitation.
    D. one which is found in the eastern part of continents, has four seasons, and mixed vegetation.

28. The Steppe Climate is
    A. one where rainfall is 10" to 20", vegetation is mainly grass, there are extreme differences between summer and winter temperatures and where soils are very fertile.
    B. one which is found in the eastern part of continents, has four seasons, and mixed vegetation.
    C. one where rainfall is scarce and unreliable, hot days and cold nights and xerophytic vegetation.
    D. one where you find permafrost, scrub vegetation and very light precipitation.

The drawing to the right should be used to identify numbers 29 and 30.

29. A rain shadow.

30. Cyclonic precipitation



PART II

The second part of this test is designed to measure the pupil's ability to apply the fundamental skills included in Part I.

Directions: Read through each story carefully. Following the story are questions about that story. Select the best answer and write the letter next to it on the space provided on the answer sheet.

Hasan Jabbar is a 14 year old boy who lives with his parents and an older brother. The goat hair tent in which the Jabbar family lives is easily transported. Hasan and his older brother help their father tend their flock of sheep and goats. The Jabbar family spends most of the winter months camped in a sheltered lowland valley near a supply of well water. Here, Hasan's father plants a small field of spring wheat which will be harvested at the beginning of the summer. Hasan's mother spends much of her day gathering fuel for cooking and preparing meals. The Jabbar family eats mostly goat's milk cheese, onions, dried goat's meat, wheat bread, dried figs, and sometimes coffee.

As the hot summer approaches, the Jabbar family packs their few belongings on the backs of camels and set off with their flock in search of green grass in the mountain valley. This annual summer migration is made necessary because nearly all the desert vegetation dries up so much that their animals cannot find food to stay alive.

Hasan wears light colored loose clothing because of the hot day-time temperatures. Cotton cloth for clothes is obtained from passing caravans. The traders carry their goods on the backs of camels. These goods include dried figs and dates, knives, coffee, sugar, tobacco, needles and thread, rifles and ammunition. In exchange for these things the Jabbar family offers skins, goat hair, goat milk cheese, and woven rugs which are made of goat hair.

The Jabbar family sometimes uses the routes of the traders during their migration to the mountain valley where they spend the summer months planting wheat and grazing their few animals. As winter approaches the Jabbar family will pack their belongings and return with their animals to the site of their winter camp. Hasan and his brother spend their time helping their father move from place to place because they cannot afford to go to school, nor can they afford little except what they can grow or make for themselves or get by trading.

* * *

31. The practice of moving flocks of animals is
    A. interplanting.
    B. transhumance.
    C. irrigation.
    D. subsistance farming.

32. Hasan's mother searches for fuel because
    A. she doesn't like coal.
    B. the winds blew down all the forests.
    C. they gave all their wood to the traders.
    D. there is a lack of vegetation.

33. Grazing areas are difficult for Hasan to find because
    A. he is afraid to wander too far from home.
    B. there is not enough rainfall to support much grass.
    C. his neighbors own all the good grazing land.
    D. most grass is poisonous to animals.

34. The Jabbar family wears light loose fitting clothing because
    A. this type of clothing is cooler.
    B. everyone else they meet is dressed this way.
    C. the family cannot afford good clothes.
    D. goat's hair cannot be woven into fine clothing.

35. Most goods are carried on the backs of camels because
    A. these people are very fond of the camel.
    B. they cannot afford a motor vehicle.
    C. they are afraid of motor vehicles.
    D. there are no roads.

36. Hasan likes to see the traders because
    A. they always give him a treat.
    B. he likes to meet new friends.
    C. they bring goods which they can't grow or raise at home.
    D. he gets excited at seeing camels.

By the narrow rugged shore, with the beautiful sea on the horizon, Domonic Messina sits and wonders how life for the fishermen in the far off distance differs from the lives of the people of his village. Domonic will not be able to satisfy his curiosity because he must think of the chores that must be done at home. There is much to be done because the hot, dry summer is about to come to a close. All the villagers must work hard to prepare the ground for wheat which will soon be planted to take advantage of the forthcoming winter rains. Having just completed the late summer harvest of vegetables, olives, grapes, and figs, Domonic dislikes thinking of the tasks which lie ahead. Preparing the ground for wheat is extremely difficult since Domonic's father has only one mule, just a wooden plow and small scattered fields in which to plant his wheat. The plowing is made difficult since the fields are on sloping hillsides and have very thin soils. Domonic's father does not permit him to do the plowing because he is afraid he might damage some of the olive trees and grape vines which are in the fields.

The job Dominic likes best is picking the grapes and helping his mother press wine. The Messina family uses the wine because drinking water is not always available or is usually unfit to drink. Extracting olive oil is a pleasant job, too, because Domonic realizes how difficult cooking without oil would be for his mother. Olives and grapes grow rather well on the Messina farm because they can live through the dry summers. While Domonic's father works in the fields planting wheat, Domonic will have to stay at home to help his mother. Domonic's mother has no difficulty finding chores for him to do about the adobe brick house. He sometimes has to patch a crack in the wall or repair a broken shutter or replace broken roof

2

tiles. Domonic prefers working out of doors because the crude oven used by his mother to bake bread often fills the house with smoke.

If his father had not wanted to save level land and their house had been built near the coast, Domonic could satisfy his curiosity by knowing that the lives of the far-off fishermen are really not much different from his. Many farmers are art-time fishermen when farm work is slack during the dry season.

* * *

37. Some farmers are also fishermen because
    A. there is more profit in fishing.
    B. there is less work in fishing.
    C. the fish provide them with more food value than the farm crops.
    D. the unfavorable farming conditions make it necessary for the farmers to fish in order to live better.

38. Domonic's father uses a wooden plow because
    A. there is no iron ore in the vicinity to be smelted.
    B. none of the farmers know how to smelt iron ore.
    C. he doesn't like to use steel plows because they plow too deeply.
    D. he can't afford a good plow.

39. The Messina house is built of adobe and tile because
    A. it can be made from local materials.
    B. there is no nearby port through which building materials can be imported.
    C. there are no skilled carpenters in the village.
    D. it is dangerous to build a wooden house because of the hot, dry summers.

40. Olives and grapes are commonly grown because
    A. they are a sign of wealth.
    B. they are religious symbols.
    C. these crops provide the people with a cooking essential and a beverage which they would otherwise have to do without.
    D. they require very little care.

41. Even though the fields are found on slopes and have poor soils, they are cultivated because
    A. this is the only land available except for the narrow coastal lowland.
    B. the winds blowing directly on shore from the sea poison crops on the lowlands.
    C. the lowlands are used entirely for drying fish.
    D. the mule works better in the cool temperatures of the high elevations.

42. Wheat is planted in the fall because
    A. the people do not like to cultivate the land during the hot summer temperatures.
    B. the people have learned to make the best use of the rain when it does come.
    C. the wheat must be harvested when people are not working with grapes and olives.
    D. the people have no place to store the wheat over the winter.

Over the hum of the mills, one can hear the sound of a boat on his way home from school. This is a pleasant sight. The boat is pushing a barge which contains structural steel, cement, and textile machinery destined for use in the new mill coming to town. This mill will use much of the cotton grown on farms nearby.

Rufus Jones stops to look and listen to the barge and boat on his way home from school. This is a pleasant sight for Rufus because his older brother hopes to find work in the mill when there is little to do on the small family farm. In the past, the Jones family have found it difficult to keep busy at times working on the farm. Corn, tobacco, and the vegetable garden require the efforts of all only during the harvest season. The worn-out soils and the erosion of the sloping fields have caused low yields which have forced these people to seek other work. Rufus is looking forward to the time when the family farm crops can be taken to the barge on which they will be shipped to far-off markets down the river. A few years ago barges did not use the river because the canals were not there to aid in steering the boats around dangerous rapids in the river. The frequent floods of the past have been prevented by the building of a huge dam upstream which holds back the great amount of precipitation in this area. The rainfall has caused the soils to be highly eroded. Rufus once learned at school that it was possible to prevent erosion on the slopes by planting trees. Even though Rufus learns many valuable things at school, he would prefer not to go to school in the winter because he would rather be out-of- doors hunting game and trapping animals. In the summer, Rufus likes to fish while sitting under a large tree because it is too hot and sticky to work in the open fields and showers often occur before he can get under cover.

As Rufus approaches his home, he notes with pleasure the sound of the new radio playing. A few years ago families had few electrical gadgets because electricity was too expensive. With the building of the dam, however, electricity is now produced nearby and transported very cheaply to all the homes and mills along the river.

* * *

43. New industries are being attracted to this area because
    A. the people are learning mechanical skills for the first time in school.
    B. many people are becoming dissatisfied with the small yields and profits of the farms.
    C. this warm humid climate is well suited to the weaving of textiles.
    D. of improved transportation, cheap electrical power and an available labor supply.

44. This farm will no longer support a family of four because
    A. the kinds of crops they grow do not sell for as high a price as in the past.
    B. people eat more today than in the past.
    C. the people have not tried to grow the best kinds of crops that will preserve the soil.
    D. the people are getting tired of the hot, humid weather conditions.

45. Until now, erosion has been a major problem because
    A. the people did not cultivate the land the right way and did not cover the bare slopes with trees.
    B. the crops they grow absorb the rich minerals from the soil.
    C. the thundershowers bring much rain which runs off very quickly.
    D. the heavy rains dissolve the minerals from the soil.

46. Rufus becomes inactive and avoids work in the summer because
    A. he is on vacation from school and that is time for play.
    B. it is the time of year when the crops need the least amount of cultivation and there is not much to do.
    C. the high temperature and sticky atmosphere do not make people feel very much like working.
    D. the law restricts hunting and fishing activities.

47. The canal lock and dam are two of many such things built in the river because
    A. it was flowing too quickly.
    B. It was an effort to make river navigation possible at all times and to help control floods.
    C. it was an attempt to keep tidal waves from coming up the river.
    D. it was an effort to provide work for the farmers during a summer slack period.

48. The people along this river valley now find it possible to own many electrical appliances because
    A. the new industries coming to the area can make them more cheaply.
    B. the people were afraid to use electrical appliances because of the thunderstorms.
    C. the numerous dams are used to produce cheap hydroelectric power.
    D. the people were not interested in them in the past.

49. People are anxious for the new mill to be completed because
    A. they are tired of hearing the boat whistles blowing as they go through the canal.
    B. work in the mill will provide a much needed income for the poor farmers in the area.
    C. the old mills dump dirty waste in the river.
    D. the people do not like to have unfinished construction cluttering the landscape.

50. The new mill will produce cotton textiles because
    A. the people like to wear cotton clothing during the hot, humid summer.
    B. cotton imports can be transported more cheaply by boat than other types of raw materials.
    C. raw materials produced on the local farms, the cheap electric power, and the local labor supply make cotton the most ideal thing to produce here.
    D. the temperatures are too hot for other types of textiles.

Ivan lives in a small village located in a large coniferous forest. Ivan does not know it, but the forest in which he lives is one of the largest in the world. Since Ivan's father was killed in a hunting accident, he lives with his grandparents in their compact but crude log cabin. Ivan went to school for 6 years but then he found that it was necessary for him to quit and help support himself and his grandparents. He could have gone to high school but he would have had to go many hundreds of miles to the south to find such a school.

The grandfather has spent most of his life cutting timber which is floated downstream during the short summer months to the paper mills to the north. Ivan has learned to cut timber much faster than his grandfather could because he uses a new power saw. During the long winter months, Ivan spends much of his time with his grandfather, trapping mink, marten, beaver, sable, and fox. He skins these animals and sells or trades the skins at the trading post for food, ammunition, traps, boots, and warm clothing. Sometimes he will shoot ducks or geese so that his grandmother can prepare a tasty roast dinner. Ivan helps his grandfather cultivate a small garden during the summer in which they grow large cabbage, potatoes, and radishes. These vegetables are sometimes buried in an earth mound after they are harvested so that they will keep until needed in the winter.

Strangely, Ivan likes the long winter better than the summer. During the summer there are many millions of biting flies and mosquitoes which breed in the lakes and sluggish streams. These insects make life very unpleasant for the boy. During the winter, on the other hand, the days are cold, the air is brisk and there is some snow nearly all the time. Ivan can travel great distances on this snow with his dog sled.

When he gets older, Ivan wants to leave his small village and go to a new town which has grown-up in the past 3 years. He has heard that men are mining uranium in this town and they are looking for other minerals. He has also heard that there is a great demand for these minerals so he feels that he might have a steady job and be able to earn more money.

* * *

51. Getting a well-balanced diet throughout the year is difficult for Ivan because
    A. he does not like many of the foods he can get.
    B. he is too busy trapping during the winter to pay attention to what he eats.
    C. he must eat the food he can get when it is available.
    D. there is a shortage of fuel to prepare the food properly.

52. Ivan's poor and seasonal diet is due largely to
    A. the infertile soil conditions.
    B. the dense forest which covers most of the land.
    C. his disinterest in eating heavily during the summer.
    D. the warmer summer temperatures which make good meat difficult to obtain and the colder winter temperatures which make vegetable growing impossible.

53. Ivan's home is remote and difficult to reach because
    A. the rivers flood during the summer and are covered with thin ice during the winter.
    B. few people can afford to buy automobiles.
    C. it lies far from other settlements and the river is frozen most of the year.
    D. the logs jam the river.

54. Ivan is looking forward to the time when his homeland will become better developed because
    A. the price of furs is steadily increasing.
    B. the United Nations is planning to buy the minerals.
    C. the mines will provide new and better jobs and greater wealth.
    D. he is anxious to see the new railroad being built.

55. Ivan does not want to be like his grandfather who spent his life
    A. cutting trees.
    B. doing the only things possible to make a living.
    C. trapping for furs.
    D. trying not to have an accident like his son.

56. There are advantages and disadvantages to growing vegetables because
    A. the growing season is short but the daylight hours are long.
    B. Ivan does not have to irrigate the fields.
    C. Ivan does not have to worry about killing frosts.
    D. Ivan does not have to fertilize the fields.

57. Ivan must store many vegetables and catch many animals because
    A. there is a great demand for these things in downstream villages.
    B. it is easy to freeze them during the winter.
    C. he needs more food during the winter.
    D. he needs a large supply of food to get through the long winter.

Bobo, age 13, and his father have just made their way back to their hut. They have returned from their neighbor's home down by the river. On the way home they searched the trail for any wild fruits or good tree roots that would be worth eating. When Bobo returned home, he quickly lay down to rest and watch his mother cook at her earthen oven. Though he is dressed only in a leaf, the hot temperature made it difficult for him to make his way through the dense forest jungle along the path from the river to his home. Bobo cannot live along the river because his neighbor uses all the land that can be kept clear. On this land, Bobo's neighbor grows small patches of rice, cassava, bananas, and coconut. In addition to the small amount of clear land, Bobo's neighbor lives at a better location because the river can be used to take surplus food by canoe to a nearby city to exchange for things he and Bobo need at home. Bobo helped his neighbor make the canoe by felling a tree, carving the log, and preparing it to float. Bobo often goes to the city to see the big ocean-going ships collect and take away the goods gathered by other natives and from nearby plantations, where Bobo hopes to work someday. These goods are taken to the markets of the world.

Although Bobo and his neighbor live only a few miles apart, their houses are a bit different. Bobo lives in a leaf-thatched, reed and bambo house. His neighbor's house is made of the same materials but is built several feet above the ground.

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58. The dense vegetation makes traveling and farming difficult here. This is due to
    A. the danger of many wild animals.
    B. the lack of machinery to clear the jungle.
    C. the rapid growth of vegetation caused by the warm temperatures and abundant rainfall.
    D. the extremely rich soils.

59. Bobo wears very little because
    A. his father cannot afford to by him other clothes.
    B. he does not like to dress up.
    C. his mother does not have time to wash and repair his clothes.
    D. the hot temperatures make it undesirable to wear anything else.

60. Bobo's family hunts for food in the forest almost daily. This is necessary because
    A. the family likes a great variety of food.
    B. wild meat and vegetables are hard to find.
    C. Bobo's mother has not learned to plan ahead.
    D. fruit and vegetables will not grow in this climate.

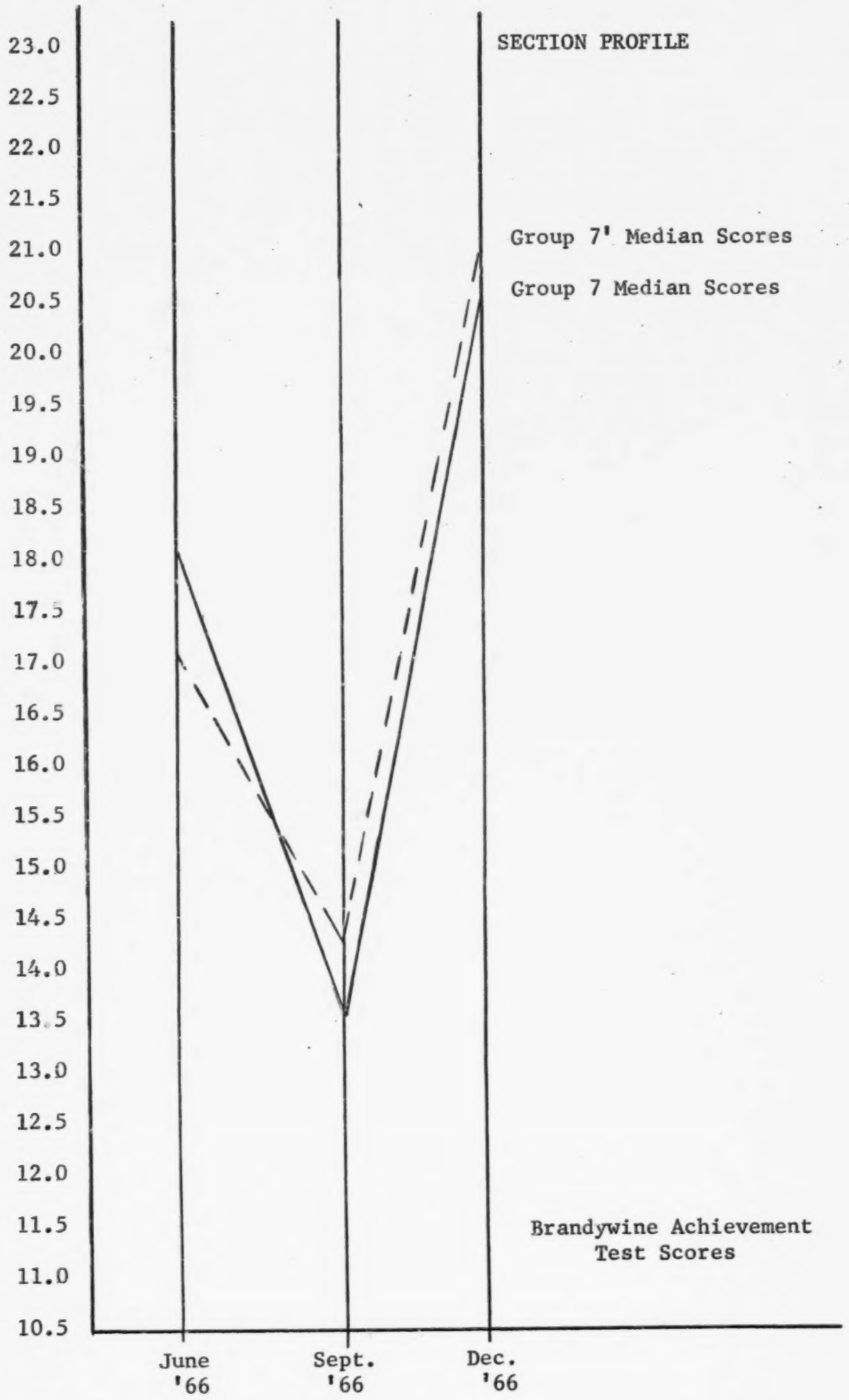
61. As Bobo grows older he can look forward to the possibility of working on the nearby plantation during certain seasons because
    A. this additional work will provide him and his family with some much needed income.
    B. he is anxious to start working.
    C. he is afraid to search through the jungle for food.
    D. he wants to earn some new clothing.

62. Bobo's house is built differently from his neighbor's because
    A. his father did not like the style of the neighbor's house.
    B. his father did not want to use the extra material to raise the house off the ground.
    C. his father did not have to worry about floods destroying their hme.
    D. his home was built later than the neighbor's home.

63. Despite floods and other hardships, Bobo's neighbor prefers living near the river because
    A. the fresh alluvial soils brought by the river are good for crop yields.
    B. he does not have to worry about dangerous wild animals.
    C. clothes are easier to keep clean there.
    D. he depends entirely upon fish for food.

64. Bobo doesn't mind the dangerous canoe trip to the city because
    A. the scenery is beautiful along the river.
    B. he has much fun in the city.
    C. there is no other convenient way to reach the city.
    D. his neighbor is a good canoeman.

APPENDIX N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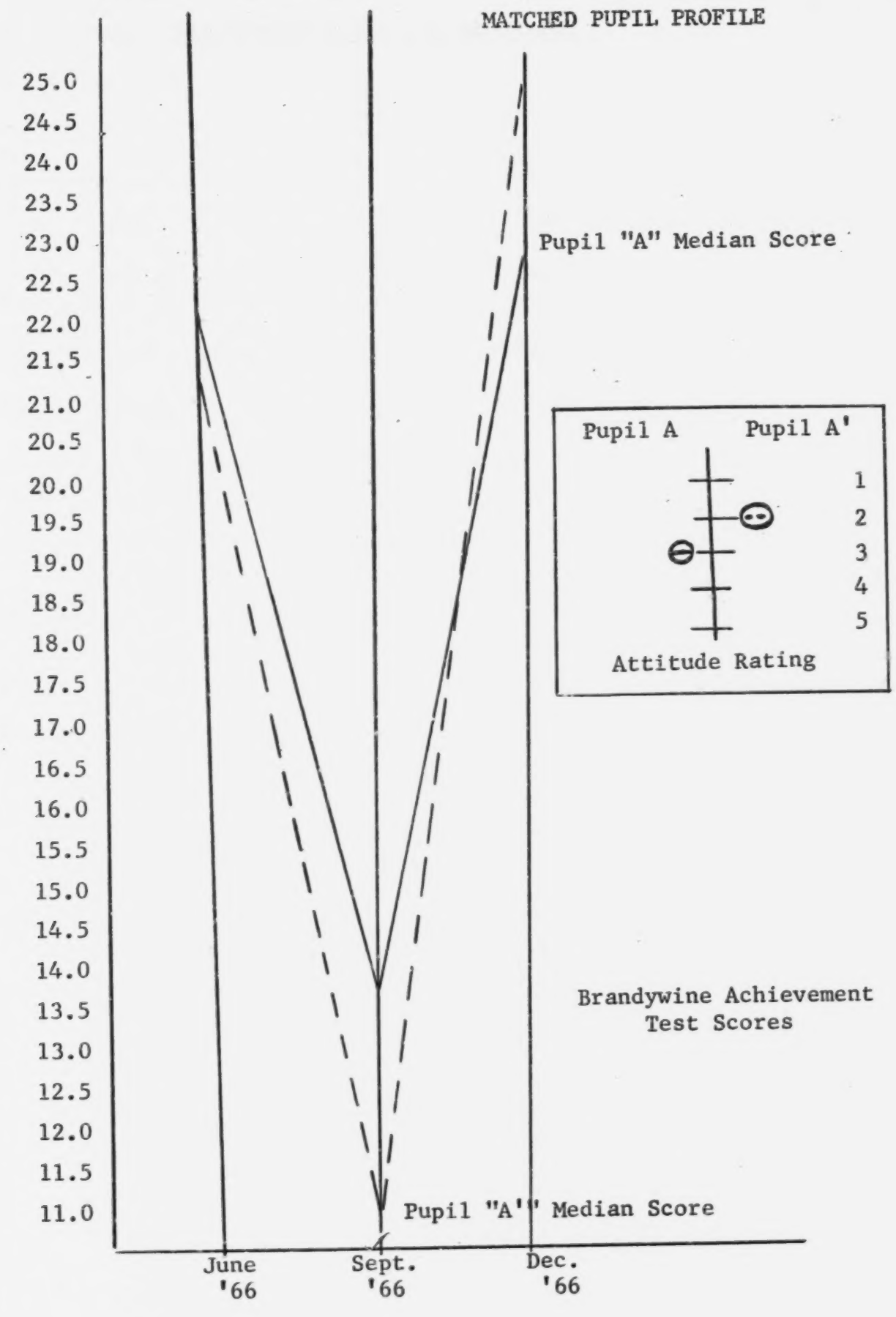
Group 7' Median Scores
Group 7 Median Scores
Brandywine Achievement Test Scores
June '66
Sept. '66
Dec. '66

APPENDIX O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Pupil "A" Median Score
Pupil A
Pupil A'
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Attitude Rating
Brandywine Achievement Test Scores
Pupil "A'" Median Score
June '66
Sept. '66
Dec. '66

APPENDIX P

AN ATTITUDE MEASUREMENT SCALE FOR GEOGRAPHY

Name _____ Grade & Section _____

School _____ Date _____

Sex (Circle) M F Age (Years-Months) _____

Directions: Place a check (✓) in the blank before the statement which best expresses your feeling for geography class.

_____ 1. Geography class is my most enjoyable class of the day.

_____ 2. Geography class is interesting.

_____ 3. Sometimes I like geography class and other times I dislike the class.

_____ 4. There is little about this class that I like.

_____ 5. Geography class is dull and a complete waste of time.

Tell in a sentence or two what you best like about geography class.

Tell in a sentence or two what you least like about geography class.

APPENDIX Q

ATTITUDE RATING SCALE ANALYSIS

TABLE I

Rating Choice*	Number and (%) of Pupils Selecting Choices Group 7	Group 7'
1	1 (9%)	4 (36%)
2	8 (73%)	6 (55%)
3	2 (18%)	1 (9%)
4	0	0
5	0	0

TABLE II

Rating Choice*	Number and (%) of Pupils Selecting Choices Group 8	Group 8'
1	2 (18%)	0
2	6 (55%)	6 (55%)
3	2 (18%)	5 (45%)
4	0	0
5	1 (9%)	0

*An explanation of rating choice items is shown in Appendix P.